INDEX NUMBER

THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION

Vol. 39, No. 12 | 540 N. Michigan Ave., Chicago, Ill. | August, 1940

EVERY osteopathic physician, without exception, is urged to fill out and mail now the questionnaire recently distributed by the Association. Questions are clear-cut and should be answered accurately.

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By Emil Novak, A.B., M.D., D.Sc. (Hon. Dublin), F.A.C.S., Associate in Gynecology, Johns Hopkins Medical School. 496 pages, 6"x9¼", with 427 illustrations. Cloth, $7.50.

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A LETTER

TO THE PROFESSION

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Chaotic world conditions and raised entrance requirements make 1940 student recruiting an imperative task and duty of every Osteopathic Physician.

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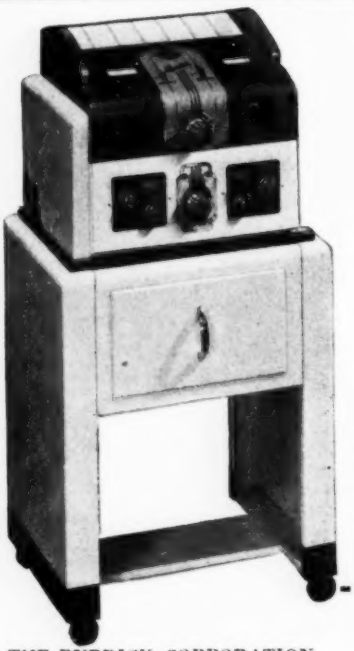

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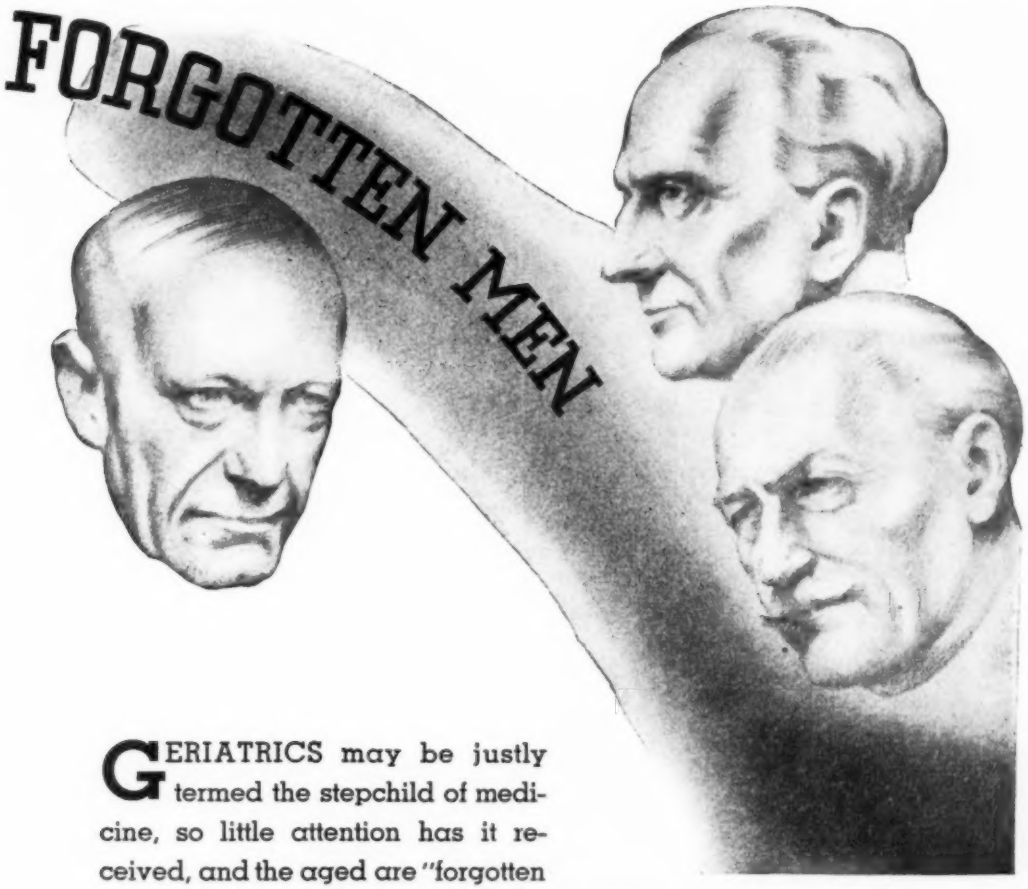

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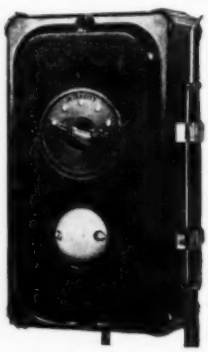

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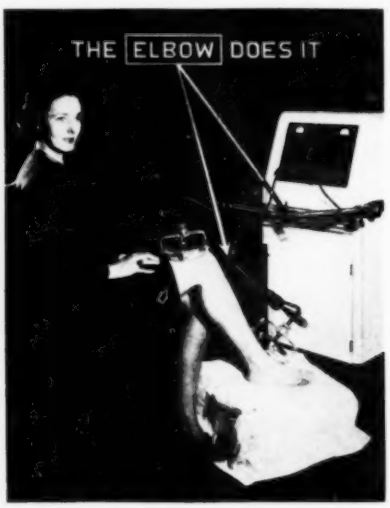

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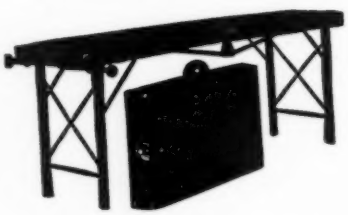

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HUMAN CALCIUM REQUIREMENTS

● The formation of bone or calcareous tissue is probably the best known use of dietary calcium by the animal body. However, calcium—as the ion or in the form of its compounds—is also concerned with certain other vital physiologic activities, among them normal cardiac function and the normal clotting of blood. The importance of an optimal dietary supply of calcium, therefore, should be immediately apparent. Nevertheless, it appears that many American diets may be deficient in this essential mineral.

Investigations have established within limits the daily needs of humans for calcium (1, 2, 3, 4, 5). By means of balance studies—in which the extent of calcium intake and excretion is closely followed—it has been possible for investigators to arrive at estimates of the daily amounts of this mineral required in various phases of the life cycle. In addition, it has been possible to study the effect of specific factors which may influence calcium utilization, such as vitamin D, phosphates, or certain anions in foods.

As to human daily calcium requirements, some differences apparently exist between the estimates of various authors. However, an allowance of 1.0 gram of calcium per day for children appears well supported by the evidence. For adults, conservative opinion is well expressed in the following quotation (5):

> "From the evidence . . . it follows that with the requirement—in the sense of estimate of minimal need with allowance for variations—now put at about 0.75 gram per day for adult maintenance, the women of the population should have an average of about 1 gram per day to provide for the occasional exercise of the functions of pregnancy and lactation without undue tax upon the mother; and that the men of the population should also have an average of about 1 gram of calcium per day, if they are to be nutritionally at their best."

Protective diet formulation has recently been admirably described (5). The basic pattern of modern diet planning provides that milk—whole or the various forms of canned milk—be included in the ration in such amounts that practically the entire calcium requirement for the individual is supplied from that source alone. Other foods which supply significant amounts of calcium (5) and which normally should be included in the varied diet, serve as supplementary sources of this essential mineral. By this means, the calcium requirement of the individual should be adequately met.

Attention might well be directed to the part which commercially canned foods might play in diet formulation to assure ample calcium intake. Milk in various forms, as well as other foods commonly regarded as valuable sources of calcium, are included among the several hundred available canned foods. The use of these foods according to the modern diet plan should assist materially in providing for an optimal supply of this essential mineral.

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REFERENCES

1. 1939. Mineral Metabolism, Alfred T. Shohl, Reinhold, New York.
2. 1939. The Newer Knowledge of Nutrition, Fifth Edition, E. V. McCollum, Elsa Orent-Keiles and Harry G. Day, Macmillan, New York.
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5. 1939. Food and Life, Yearbook of Agriculture, U. S. Dept. Agri., U. S. Government Printing Office, Washington, D. C.

We want to make this series valuable to you, so we ask your help. Will you tell us on a post card addressed to the American Can Company, New York, N. Y., what phases of canned-foods knowledge are of greatest interest to you? Your suggestions will determine the subject matter of future articles. This is the sixty-second in a series, which summarizes, for your convenience, the conclusions about canned foods reached by authorities in nutritional research.

Osteopathic Magazine for Sept.

RELAXATION FOR SCHOOL CHILDREN

By Eleanor Vore Sickler

The author, a public school principal-teacher, describes the program of mental and bodily quiescence instituted by her as a regular part of the school day, and its good effects on the children.

EARLY CHECK-UPS MEAN BETTER HEALTH

By Kathryn E. Ritchie

Description of an annual osteopathic health check-up made by seniors and some members of the faculty of the Chicago college in the Midlothian Public School, with the favorable reactions of teachers and parents to the procedure.

SEPTEMBER COVER

YOUR LIFE'S BLOOD

An adaptation of a radio script prepared by the Committee on Public and Professional Welfare describing the makeup of the blood, its functions, and the diseases which may attack it.

WHEN TEETH NEED STRAIGHTENING

By Mary N. Bercea, D.D.S.

A Los Angeles orthodontist, tells how crooked teeth may affect health, and describes preventive measures against malformed dental arches, and the role of the orthodontist in correcting the condition.

A RECIPE FOR LIVING

By Norma Sherburne

An interesting story about Dr. Helen C. Bridges of Providence, R. I., and her many hobbies and interests, reprinted from a local newspaper.

TEACH CHILDREN TO SAVE THEIR EYES

Rowena Gailey

A discussion of the amount of light necessary for the preservation of good eyesight, emphasizing the need for training children to take care of their eyes.

BIRD SECRETS

By Elaine Martin Drew

A fascinating story about bird-banding and the purposes it serves, written by the wife of an osteopathic physician who bands birds as a hobby and has sent out into the flyways over 2,500 birds in the last four years.

HUMBLE BEGINNINGS

By Caleb

An inspirational article showing how the leaders of today and most present-day inventions can be traced back to humble origins.

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HEALTH ROUND-UP TIME

Children will soon be back in school. Now is the time, before school starts, to tell parents how necessary it is that their children be physically fit for the strenuous work ahead. Here is an article that does just that.

JOBS—CUSTOM MADE

The physician offers his suggestions to the young adult who is about to choose an occupation. His opinions are based upon his knowledge of the young man's physical and mental capabilities and psychological makeup.

MAN-MADE DISEASE

A warning on the use of certain drugs which may result in serious blood disorders and other bodily affections.

AIR-CONDITIONING AND HEALTH

Some of the advantages and dangers of air-conditioning are related here by one who has made a thorough study of the subject.

Osteopathic
Health
The health of our people is really the foundation upon which all their happiness and all their powers as a state depend. — Disraeli.

O. H. NO. 129 (SEPTEMBER)

Enough Patients!

The doctor who says he does not use educational literature because he has all the practice he can look after is indeed fortunate. He is the man who can well afford to send out large quantities of literature for the good of the cause.

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Thoughts on the Autonomic Nervous System

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INTRODUCTION

A need has arisen for some attempt at correlation of humoral mediation of nerve impulses, a theory now accepted, with endocrine hormones and the operation of these in vivo, not as isolated instances under laboratory control but as integers of a unit under adverse and under normal conditions. The harmonious interplay of antagonistic and synergistic hormones and humors as affecting and affected by the less delicate functioning of the skeletal and visceral tissues, merits such an effort.

CHAPTER I

The physician must realize that a large percentage of the disabilities he sees are functional; that his services are sought primarily because of pain, sensory or motor disturbances, which the patient can appreciate.

Sir James Mackenzie neatly defined symptoms as the disturbances of normal reflexes. A normal reflex is certainly purposive and should be painless. Through a chain of conditioned reflexes we associate ideas and achieve consciousness. This consciousness appreciates that a disturbance of the normal reflex is painful, and being still purposive proceeds to investigate the cause of the pain. The dog licks his bite, the burnt child dreads the fire, but from such simple defensive reflexes as these are built up elaborate associations of ideas until in the process of social evolution certain individuals become set apart to be epicritic on other people's protopathic sensations and to try and rectify these disturbed and therefore painful reflexes. There is thus no break in the chain between simple reflexes and the evolution of the medical profession. Behold us, here assembled as the last link in a long chain of conditioned reflexes.[1]

The reparative processes of the body can be aided and a large part of early structural disability repaired by the proliferation of cells; where gross structural damage has been done there is a compensatory proliferation in an analogous organ or an heterogenous organ assumes a large portion of the function. This is accomplished through circulatory changes regulated by the autonomic nervous system. In the first instance disturbances of the sensory or motor function are reflected in the circulation. In the second instance, trophic changes occur as the result of an altered circulation and in the third instance the circulation is attempting to compensate the damage.

Thus seemingly minor disabilities must be segregated into those which are entities and those each of which is an initial stage of a more serious complaint. A minor disability should not be thought of, as is customarily done, as a symptom of a recognizable disease, but rather as a potential sign or cause of a number of possible diseases. It is not always necessary or desirable that the patient be impressed; it is essential that the physician know that a strain of the shoulder girdle may so interfere with one of the cervical ganglia as to be manifest later as angina, sinusitis, or presbyopia *et al.*, and treat accordingly. This conflicts with much of the thought now accepted. Patients merit more attention to symptoms, in the light of potentialities. The only excuse for not investigating each case more fully is that already there is too much to do in attending those in which the damage has been done, and the disorder can be diagnosed. This panders to the pride of the doctor and pampers his sense of being needed, but allows the patient to pass into a phase which he too often cannot be cured.

The present article will be an attempt to show the reciprocal relationship between the great visceral and skeletal systems, through the autonomic nervous system and the endocrine glands. The usual outline of treating the organs as units will not be followed; instead, metamerism and embryologic derivation will be used as a basis for this discussion. The ontogenetic specialization will be more easily understandable if approached in this manner.

Head[2] described the hyperesthesia and hyperalgesia along the course of the parietal nerve in close central connection with a nerve supplying a diseased viscus. His observations, from which he propounded a law, provide the foundation for a series of deductions and conclusions of inestimable value in the study of human clinical pathology. Still[3], a contemporary of Head, whose acuteness of observation equalled that of Head, working independently formulated a system of therapy which is the converse of Head's Law. He observed that manipulation of, or applications to, the

parieties in the segment of the referred pain ameliorated the disease in the viscus. Still, with little or no attempt to describe the pathway, made great practical application of the converse of Head's observations. To Pottenger,[4] who elaborated in his book, "Symptoms of Visceral Disease," Head's Law to a great degree of refinement, for his acuteness in observing not only sensory reflexes but also trophic and motor reflexes, much honor is due.

Tasker[5] recorded the theory and practice of Still with considerable understanding of his logic. None of those named above attempted to describe the pathway of the reflex. Head's observations depend on the sensory impulse being transferred from the visceral sensory fiber to the parietal sensory fiber in the same segment. Still's procedure depends upon a parietal motor or sensory impulse being transferred to an effector visceral neuron.

The organs of perception, i. e., the sense organs, the organs of conduction and interpretation, are derived from the ectoderm. The organs of effect are derived from mesoderm and entoderm, but the effective impulse is conveyed over tissue derived from ectoderm. Ectodermal tissue projects itself into the mesoderm and although there is no apparent segmental delineation of the neural tube, the neurons emerge between the mesodermal segments, in some instances terminating in the mesoderm and in others traversing it to terminate in the ectoderm and entoderm. Omitting for the present the limb plexuses, a segmental arrangement of the paraxial mesoderm is an index to the reflex relationship in the later development of the individual. If the innervation adhered to segmental relations, the subject would be very simple, but not only do the longitudinal (lateral) commissure, the intercalated neuron, and the fasciculi of the cord, make for great complexity, but also the reflexes to the spinal parieties induce in them an altered tonicity which may extend over several segments and interfere with their functioning. Associated with this is an altered pH and circulation. These changes occur only if the stimulus is beyond the threshold of the segmental ganglion. To comprehend the wide range of chemical, skeletal and nervous involvement arising out of an impulse overflowing the usual channel, is to grasp pathology at its inception.

Although the viscus may be found at a different level in later life, its nerve supply is dependent upon and derived from its foetal position. This has a most important bearing since the myotomes at that period are in segmental relation with the nerves. The reflex muscle spasm, noted by Still and others and described by Pottenger, becomes of particular value only when the embryological structure is kept in mind.

The complete segmental nerve is made up of four parts, a somatic part of afferent and efferent fibers and a visceral part of the efferent and afferent fibers (Edgeworth[6]). Somatic nerves, in contrast to the visceral nerves, are formed of short connector elements entirely intra-spinal, the cell lying in the posterior horn and its axon arborizing around an anterior horn cell. The receptor and effector neuron of the somatic nerve may be quite long. In contrast, connector fibers of the visceral neuron are long; arising in the lateral horn, its axons emerge from the cord with the anterior root to arborize around a cell in a sympathetic ganglion. It may be in relation to several effector elements. This is purposeful, in that in the case of the somatic nerves it provides for deliberate and delicate functioning and in the case of the visceral nerves provides for diffused effects. To view the connector and effector neurons as upper and lower neurons as in the central nerves might provide an explanation for many seemingly contrary attributes.

This will be discussed more fully in a later chapter. It need only be mentioned here that whereas a lesion affecting a central upper motor neuron results in spastic paralysis and one affecting a lower motor neuron in flaccid paralysis, so might a lesion affecting the preganglionic fiber result in visceral spasm and one affecting a postganglionic fiber in visceral relaxation.

The acquisition, digestion and assimilation of food by the animal is a good example of autonomic balance undistorted. A visceral sensory impulse (hunger) is transmitted to the brain and forces are set in motion to obtain food. It may involve a fight. The brain sends out voluntary motor impulses and either from the brain or from somatic demand sympathetic impulses arise to maintain adequate heart function and sufficient parietal circulation, at the same time the visceral arteries contract and peristalsis is at a minimum. At this stage there is a balance between voluntary and sympathetic activity. The food obtained, visceral circulation increases, peristalsis is active and the glands are secreting. The cardiac activity and the blood pressure are maintained although the volume of blood is transferred from the parieties to the viscera. At this stage there appears to be a balance between sympathetic and parasympathetic activity. Assimilation proceeds under a phase of subsiding activity of both the somatic bulbosacral and the thoracolumbar groups. All functioning in both striped and unstriped muscle is at a low ebb and the activators are quiescent, the subject somnolent. This construction does not harmonize with that put forward by other authors who maintain the necessity for a bulbosacral or thoracolumbar ascendancy at all times. It conflicts with the premise that sympathetics and parasympathetics are antagonists in so far as it presumes their inability to function at the same time.

In the presence of danger the sympathetic phenomena may anticipate the voluntary so that the pupils dilate, the blood pressure is raised, the heart accelerated and the pilomotor muscles stimulated prior to general muscular activity. A wound, however, demonstrates the selective ability of the autonomic system: nearby skeletal vessels contract, fibrin is increased, there is a local leucocytosis, while the remainder of the body is prepared for defense. In the event too much blood is lost, there is a lowering of all activity—heart rate, blood pressure, peristalsis, etc. This effort toward conservation is not synonymous with parasympathetic ascendancy although there is a transient phase in which this occurs, leaving the abdominal vessels dilated and the skeletal contracted. It is important that vagus stimulation, while it slows the heart rate, increases the force of the beat and that sympathetic stimulation increases the rate. Stimulation of either is undesirable with the body at rest. In convalescence from a wound or disease there is a balance at low level.

The threat of infection is provided against by heightened activity of both the bulbosacral and thoracolumbar outflow, instead of, as in a physical threat, by the heightened activity of central and sympathetic outflow. The features of each parallel the other; increased blood pressure, heart rate and force, diminished peristalsis, dilatation of the pupil, etc., up to the point where the pilomotor muscles and sweat glands do not operate and fever ensues. This may be determined by absence of the humor released at the periphery by voluntary activity, or may represent selective ability of the visceral afferent neurons.

It is notable that in defense against external forces the autonomic nervous system is outstanding in its provision against potential demand, but that the central nervous system is dominant in the defense action. On the other hand, defense against invading organisms, poisons, etc. is maintained or carried on almost exclusively by the autonomic nervous system. Clinically it would seem that an effort at defense against psychic influence by the central nervous system not only defeats its own purpose but also retards the reparative processes.

The burden of maintaining physiological balance is on the autonomic nervous system. The original impulse must be exogenous; this may be as early in life as the passage of the foetus through the parturient canal and is repeated an infinite number of times throughout life. It is only when this exogenous impulse is beyond the immediate abilities of the body to react that a pathological reflex is set up. Trauma makes a demand on the autonomic system and at the same time may produce permanent deformity — osseous, ligamentous, muscular, dermal or other. Pathogenic bacteria again make demands on the autonomic system and may leave permanent scars. Poisons result in similar demands and possibilities. Psychic disturbances are likewise of exogenous origin and although there are no visible scars in evidence, clinically or at post mortem, it is well known that the demands on the autonomic system are equal to those of other external stimuli. Once the pathologic reflex is initiated, the muscles supplied by the corresponding spinal nerves become hypertonic. This occurs regardless of the source of the original stimulus.

A lack of physiologic impulse resulting from a scar may be as important as an excess of stimuli. With the contracture of the musculature the tissue chemistry is altered and the medium through which nerves course is perverted. In the spine, for instance, as the muscles do not contract equally, the vertebral articulations are affected and the range of motion limited, thus providing inadequate circulation to the surrounding structures. A vicious cycle begins.

It is as essential that there be adequate stimuli as it is that they be not beyond the body's capacity. Putting it differently, there is an optimum range at which physiological proceedings are best maintained and above or below which pathology begins. Modern life offers an excess of mental or emotional stimuli with no adequate physiological outlet. In as much as it has been assumed that it is the duty of the autonomic system to maintain the physiological balance, it can be seen that the demands thereon are correspondingly increased. This may be necessary as a phase of evolution. It does, however, create a problem in therapy. The morbidity and mortality from degenerative disease (old-age diseases) e.g. arteriosclerosis, cardiorenal disorders, arthritis and cancer, are increasing. That these may be due to inability of the autonomic system to meet and overcome the demands placed upon it, is entirely within reason. The action of that system is selective. It is not inconsistent that the reflex through the spinal nerve, resulting in increased muscle-tone, is at one time the preparation for action, and at another time the provision for rest by limiting motion in that region.

The same reactions are noted as a result of external stimuli. If benign, the bulbosacral outflow is predominant; if malignant, the lumbothoracic is predominant; if overpowering, the bulbosacral is again predominant. There is a vast intermediate field of functional disturbances in the consideration of which the primary cause is lost sight of. It may have been psychic, traumatic, toxic or bacterial. If traumatic, exposure and posture are included, structural or functional damage of a more or less permanent nature may follow any of these. All, depending upon degree, call for manifestation of the sympathetic or the parasympathetic syndrome. To repeated mild stimuli the body brings up a defense; to trauma, hypertrophy (callus); to psychic disturbances, lessened sensibility; to bacteria, antigen; to exposure, often hypertrophy. It all calls for effort on the part of the autonomic system to maintain the balance. Blanching of the skin is evidence of contraction of skeletal vessels, and must be accompanied by dilatation of splanchnic vessels. If, as in the exposure preceding pneumonia, this results in pulmonary congestion, this provides fertile soil in the lungs for the pneumococcus. Inflammation brings about sensory and motor reflexes in the myotomes and dermatomes and result in perversion of the vertebral articulations which in turn become a source of inimical impulses over the effector neurons and may manifest themselves through intercalated neurons with the result that there is motor, trophic and secretory malfunction in a distant segment.

The great preponderance of stimuli are exogenous. It may be questioned even that hunger, the sex impulse, the need of oxygen and of muscular action are entirely endogenous. The excretory impulses, although per se endogenous, would not derive except for previous external stimuli.

The relation of the autonomic system to the production of antibodies, opsonins, leucocytes, antigens and hormones is highly speculative. Yet, since it is the coordinator in the defense mechanism, it must be the instigator of these armaments. Certain forms of treatment such as the Elliott[7] and osteopathic manipulation[8] have been shown to increase leucocytosis and raise the opsonic index, other forms of treatment such as nonspecific protein therapy have been demonstrated to increase antibody formation. Since some glands are known to have autonomic fibers, the hormones can be accounted for directly. If the other factors could be shown to be produced in any organ or organs, the excitor impulse could be more readily demonstrated.

CHAPTER II

Adult anatomy presents many sharp changes from fetal anatomy. These are oftentimes more apparent than real. A close study reveals the scheme of each

stage of development running through the adult form. Frequently the skein is traced more easily in the manner of functioning than in the anatomical form. Something is sacrificed for the simplicity gained when anatomy and physiology are divorced, just as a concept of the whole organ is lost when a section is studied microscopically. Keeping in mind the picture of the whole organ while studying a part is comparatively easy, but to retain the complete concept of physiology, for instance, while concentrating the study on anatomy, enjoins increasing familiarity.

At the risk of some sacrifice in clarity, the common custom is followed here.

The notochord, neural tube and mesodermal segments have been described ably and a comprehension of them is presumed. These form a relatively simple standard from which the study of a very complex structural and even more complex functional, mechanism can be approached.

The paraxial segmentation of the mesoderm permits the injection of projections from the neural tube and these are joined by projections from the primitive vascular system and accompany them. However complex the development, the pattern is as here laid down.

There appears to be some disagreement among anatomists as to the segmentation of the paraxial mesoderm. Prentiss[9] describes three cephalic segments. Gray[10] says:

> Those of the trunk may be arranged in the following group, viz.: cervical eight, thoracic twelve, lumbar five, sacral five, coccygeal five to eight. Those of the occipital region of the head are usually described as being four in number. In mammals primitive segments of the head can be recognized only in the occipital region, but a study of the lower vertebrates leads to the belief that they are present also in the anterior part of the head and that altogether nine segments are represented in the cephalic region.

Charlotte Weaver [11] describes three cranial vertebrae. This coincides with embryologic anatomy and is consistent with the ganglionated cord being continued with the primitive segments into the cephalic region. It likewise corresponds with Gray's description of the chondroblastic anlage of occiput, sphenoid and ethmoid. After the ventral migration, the neurons coalesce in the cervical region to form the prevertebral ganglia, and those in the cephalic region coalesce to form the carotid *et al.*

Segmentation of the mesoderm is not complete at any time and in the course of growth in the mammal fusion of several of the segments of the paraxial portion takes place. The segments of the paraxial portion, the myotomes, develop and in lower forms of life persist, as distinct muscles in the adult.

The vascular system first makes its appearance outside the body of the embryo. From the primitive dorsal aorta twenty-seven pairs of budlike projections grow out between the somites. At the same time filaments from cells of the ganglion crest are also being projected between the segments so that finally the nerves accompany the vessels of their own segments. As the isolated ganglion cells coalesce in some instances, so do the primitive vessels and somites. The key to adult physiology lies in the primitive relationships.

For the purposes of description the nervous system is divided into central and autonomic, each possessing afferent and efferent portions. The efferent portion of the autonomic is again divided for convenience into sympathetic and para-sympathetic. The latter is in reality visceral motor branches of the cerebrospinal functioning automatically. The cell station is in the grey matter of the medulla. Various diagrams represent a ganglion interposed near the motor end plate, but description of this as a cell station is vague or lacking. Whether fibers are interrupted in these or traverse them is also vague. The afferent (or at least those that are known to be afferent) are visceral branches of the cerebrospinal sensory nerves. The cell stations are in the ganglia of the posterior root nerve. The sympathetic or thoracolumbar is a collateral, semi-distinct system. The cell stations are in the longitudinal commissure or terminal ganglia.

The sympathetic division is formed, when the embryo is about seven millimeters in length, by the ventral migration of cells from the neural crest. These advance to the position of what is later the sympathetic trunk or to collateral or terminal ganglia in the visceral plexuses. The migration of cells from the neural crest corresponds to the segmentation of the paraxial mesoderm and is in anatomical relation at this time with myotomes and dermatomes of the latter. Functional but not anatomical relations persists through life. Fibers grow from the cells which have taken up a ventral position to arborize around the cells in the lateral horn of the medulla. In the adult these fibers to the lateral horn arise only from the thoracic and first three lumbar segments of the cord and exit with the anterior root nerve. They do not always arborize around cells of the same segment, but may traverse the ganglia formed by these cells to terminate in ganglia formed by cells having their origin in the cephalic, cervical, sacral or coccygeal portions of the neural crest. In these regions the segmental arrangement is lost and the cells group themselves into the carotid, superior, middle, and inferior cervical ganglia, ganglion impar *et al.*

Although the anlage of the ganglionated cord is composed of cells arising from the neural crest opposite each primitive segment, cephalic four, cervical eight, thoracic twelve, lumbar five, sacral five and coccygeal five, those in the cephalic, cervical, sacral and coccygeal coalesce to form one or more ganglia in each region and receive their central fibers from the dorsolumbar lateral horn. These fibers traverse the intervening ganglia to terminate by arborizing around cells in one more distant. In the cephalic region the carotid corresponds to the superior, middle and inferior cervical and is part of the longitudinal commissure. Fibers traverse it to terminate in the ciliary, sphenopalatine, otic, semilumar, which are analogous to collateral and terminal ganglia of the trunk.

There is some doubt as to whether or not cells from the neural crest migrate ventrally in the cephalic region. If they do, the carotid is thus laid down and communication established by way of the lateral commissure as in the cervical ganglia.

These ganglia are the cell stations for sympathetic fibers accompanying the tenth nerve. It must be noted that the long connector fibers to these ganglia can rise only from the thoracolumbar region. This is true also of the superior, middle and inferior cervical ganglia, the sacral segments and the ganglion impar. Fibers terminating in these or traversing these to ter-

minate in cells in collateral or terminal ganglia have their origin in the thoracolumbar outflow from the lateral horn cells. Nonmedullated fibers from the lateral commissure or ganglionated chain are given off along their entire length, cephalic to coccygeal, to course with the anterior root nerve. These are the gray rami communicantes.

The bulbosacral portion of the vegetative system is composed chiefly of two nerves, the vagus and n. erigens. Although the ninth and eleventh cranial may be included, as may be the phrenic, the fibers forming these pass directly to be distributed with the terminal plexus and do not arborize around a ganglion cell as do the sympathetic. The existence of synapses in the course of the bulbosacral outflow is questioned. In the case of the ninth, tenth and eleventh cranial at least the origin is in the part of the medulla oblongata, nucleus ambiguous, continuous with the anterior horn of the medulla spinalis. It is likely that those fibers from the second, third, fourth sacral, which go to make up the n. erigens have a similar origin, i.e., anterior horn. An attempt will be made later to show the greater similarity of the bulbosacral outflow to the structure and function of the voluntary nerves than to those of the thoracolumbar stream, and its anatomical and physiological dissimilarity to the latter.

The visceral afferent nerves have their origin in multipolar cells of the spinal ganglion on the posterior root nerve and traverse the sympathetic ganglion without interruption. In the region between the first thoracic and the third lumbar the fibers join those from the lateral horn, become medullated, and course together to the ganglion. They are the white rami communicantes. The segmental arrangement is consistent and continuous with the divisions of the cord and vertebrae. The ganglia jugularis and nodosum of the vagus and the geniculate ganglion of the seventh correspond to the spinal ganglia. There is no irregularity in the afferent portion. (Gaskell[12]).

Since a study of the literature reveals no direct afferent-efferent pathway in the sympathetics and since the only efferent pathway to the sympathetics is by way of the thoracolumbar lateral horn cells, afferent impulses from the head region must be transmitted along the descending fasciculi of the cord to these segments and relayed back to, or through, the carotid ganglion. Impulses arising caudad to the third lumbar must be transmitted to the efferent fibers of the thoracolumbar outflow through the ascending fasciculi of the cord.

The dendrites of the multipolar cells in the spinal ganglion arborize around the cells of Dogiel which in turn arborize around unipolar cells of the somatic sensory nerve. By this route a portion of the afferent impulses are transferred to the sensorium and a consciousness of pain or rather disturbance perceived, but sensed as at the accompanying somatic nerve end plate. The greater portion of impulses, and all normally, reach the lateral horn for effective action.

Sajous[13] contends that the pituitary organ is a nervous structure and that the pharmacological effects produced by its extract do not prove it to be glandular. Langdon Brown[14] says that it is often regarded as the head ganglion of the sympathetics.

It is of ectodermal origin. The pars nervosa arises from the diencephalon and the anterior and intermediate lobes from a buccal projection. Sympathetic fibers reach it through the superior cervical ganglion. Whether they are interrupted or go direct from the lateral horn, as do those to the adrenals, is yet to be determined.

The adrenals contain nerve cells in the medullary portion and are derived from neuro-ectodermal tissue of the sympatho-chromafin syncytium. They are distinctly allied with the sympathetic system but may come to be more completely divorced as evolution progresses. The pharmacological effect of its extract is sympathicotropic. Here, however, are found cells (nerve) and fibers from the lateral column entering directly without interruption into sympathetic ganglia.

CHAPTER III

The chief role of nervous tissue is to transmit a message or impulse. It is no less so whether the nerve be afferent or efferent, voluntary or vegetative. Nor is nervous tissue the sole means of relaying messages from one region to another. The circulation does so as do its several components. The muscles do so and the intestinal tract does so.

Much has been written about the individual structures or groups. Emphasis has been placed on concentrated observation and little on coordination.

This discussion will be unsatisfactory since in viewing the function of the components an attempt will be made to relate them to the whole, both as it affects and as it is affected by the nervous system. Since this from its very nature can be no other than inconclusive, the end will not be realized.

The nervous system as an integral part of the body is affected by the digestion, as it affects digestion, by the endocrines, as it affects them, and by the circulation. Each in turn operates for and is influenced by the other, perhaps none to be called dominant, certainly none independent.

There is nothing in the physiology of the nervous system to conflict with the conclusion that the chief role of the nerve tissues is conduction. Except for myelination there is little histological difference between voluntary and involuntary nerves. Distinction between cerebrospinal, sympathetic and parasympathetic is only for convenience in description. On the afferent side the fibers follow a prescribed course but may function at different levels. Both the intensity of the impulse and the "frequency of wave length," if that term can be used, dictate the effector neuron or neurons to which it may be transferred. In other words, although it may actually be in direct segmental and synaptic relation with an effector neuron, unless that neuron is "tuned in" to the same frequency there will be no response in the visceral efferent nerve.

This is confirmed, indeed, by the work of Erlanger, Gasser and Bishop[15], who describe action potential of the nerve impulse as having wave lengths varying from three tenths to ninty meters a second. They distinguish three roots of fibers in the somatic nerve, designating them as *alpha, beta,* and *kappa.* Subsequently, Erlanger and Gasser[16] grouped the *alpha, beta* and *kappa* together, designating them A fibers and discovered two other groups which they labeled B and C. Whether or not the B and C groups may be as complex as the A group is open to speculation.

From the study of the observations recorded by Head[2] on nerve and spinal cord injuries and the nervous manifestations following, a criterion is established. To transfer these attributes of somatic nerves to visceral nerves is but one step. Mass reflex is not a visceral or even a sympathetic attribute per se at the present stage of evolution, but is manifest only under certain prescribed conditions, e.g., lowering of synaptic resistance, or increased stimulation or both. Biphasic activity, which his illustration so clearly demonstrated in somatic nerves, can be assumed to be equally a property of all nerves.

Segmental relation is pretty well lost in adult life outside of the thoracolumbar region. Although it appears to be lost anatomically, it is probably not so physiologically. The coalescence in the cephalic, cervical, sacral and coccygeal, and the communication in the thoracolumbar region foster an intricate reflex mechanism. There is, however, convection of impulses and this is direct through the ontogenetic pathways.

Assuming for the moment that there is a difference in the character of the impulse as between the sympathetics and the parasympathetics, the nearest conception within the present scope of knowledge would be that in the one there would be a negative discharge at the motor end plate and in the other a positive discharge. That is, if a similarity to electricity can be assumed, the fibers that do not pass through a ganglion might discharge anions and those that are interrupted in the ganglion discharge cations at the end plate or vice versa. The sacral and cephalic contributions to the viscera are not interrupted in the sympathetic ganglia. A few fibers that might be interrupted in the carotid ganglia are sympathetic fibers from the cephalic portion of the longitudinal commissure which accompany the vagus nerve. The size of the vagus precludes the possibility that the main body of fibers of the vagus is interrupted in these relatively small ganglia. The fibers of this portion of the system pass directly from their origin in the medulla or cord to their respective plexuses. Few, if any, of the fibers, however, of the thoracolumbar outflow pass directly to their plexuses. They are interrupted in some ganglion which may act as a transformer to raise or lower the potential, change the nature of the impulse from direct to alternating, or change the character of the impulse from negative to positive or vice versa. This carries the simile to the ultimate in electrical comparison. What more there may be to the nature of a nerve impulse is beyond present comprehension.

It is simple and logical to regard the terminal response to nerve stimulation as based on the type of humor released in connection with the type of respondent. Striated muscle and smooth muscle respond to nerves that release acetylcholin, but the muscles of the heart and arteries respond to (are stimulated by) adrenergic or sympathicotropic nerves and all muscle responds to (or is capable of response to) the release of mediators, electromechanical or chemical stimulus. This would presume the muscle response in two directions, i.e., to relax or to contract according to the type of the stimulus. As far as is known, muscle responds in only one direction—contraction. Then, if there are vasodilators, they must act to stimulate opposing muscles e.g. the longitudinal muscles of the arteries.

Stimulation of fibers which are not interrupted in the ganglia, but traverse them to terminate in the plexuses, results in the same physiological effect as inhibition of impulses and fibers that are interrupted in the ganglia.

It is pertinent to inquire into the mechanism of vagotonia and sympathicotonia. Although these terms are apt in describing a clinical syndrome, an appreciation of the means by which vagotonia and sympathicotonia occur is desirable. These conditions may be considered as being inherent or acquired, and viewed as physiological or pathological, depending on their degree or the criteria by which they are studied. One or the other tendency may be as much a part of the individual as it is for his skin to be white or red, in which case it is normal, or either tendency may be acquired from accident, environment, diet deficiency, etc., in which case it is likely to be abnormal and sometimes correctable.

The modes of operation may be explained by some of the following theories: The viscera are supplied with dual innervation. In muscular organs there is a dual set of muscles. If the circular muscles are supplied by parasympathetic fibers and the longitudinal muscles by sympathetic fibers, it might be one explanation of antagonistic action. A second explanation might be the release of acetylcholin disproportionately to the release of sympathin or adrenalin through irritation to parasympathomimetic or sympathomimetic structures. An increase or decrease of hormones of antagonistic or protagonistic glands would provide a third, and a biochemical imbalance a fourth.

The myelin sheath serves the purpose of an insulating covering for the nerve fiber. Its presence in the preganglionic fibers prohibits the induction of association currents in fibers adjacent to those conveying an impulse. Where it is absent, e.g., in postganglionic fibers, it is fair to assume induction impulses in adjacent fibers if one in the same bundle is stimulated. Admitting that the myelin sheath is purposeful, such a hypothesis meets the requirements. There is much reason in the assumption that the nerve impulse parallels electrical transmission at or near the vibratory rate of the latter.

The neurilemma of the cerebrospinal nerves confines them to direct and limited purpose. The lack of it in autonomic nerves very likely enables, or at least contributes to enabling, them to exert a widespread or massive effect. The interposition of a synapse in the sympathetic system suggests the possibility that the impulse is either "stepped up" or "stepped down" or that its poles are reversed by its passage through the synapse. To remark the absence of this in the parasympathetic system calls for an explanation of its antagonistic functioning. If one could conceive of a violin string vibrating an infinite number of wave lengths, and add to these overtones, and the electrophysical qualities of telephone and radio, one might have some comprehension of an afferent nerve. To add to these an automatic switchboard, make it selective, and enable it to transfer the message to outgoing wires capable of intensifying or diminishing, might afford some comprehension of the physics.

In the attempt to study the nervous system both from an anatomical and from a physiological point the essential factor is lost sight of. It is so with any analysis, the observer cannot see the woods for the trees. As phylogenesis progressed chemical or mechanical irritation, which at first was sufficient, was supplemented by a primitive nervous system. This may have been the forerunner of the present protopathic qualities. As necessity arose the autonomic nervous system developed and possibly along with that trophic nerves and an appreciation of deep sensibility. Epicritic sensibility is only of comparatively recent origin, at least in so far as the voluntary system operated. The complex structure kept pace with the other organs as they evolved and with the environment as it changed. Since the primary effort is still towards survival no matter how complex the means, the physiology is based on the necessity of nourishment and protection. It involves coordination of the two nervous systems and the transference of impulses of the one to the other—sensory to sensory, motor to sensory, sensory to motor, motor to motor. The nerves are only one means of coordinating the organs, not the only means.

Pathology lies in an alteration of the sending or receiving apparatus, in the apparatus for transmission, or in the nature of the messages. It is in the transmission apparatus that the greatest therapeutic sphere lies.

The provision of the body economy to elaborate its own antitoxins and antigens will be taken up in a later chapter.

That there is an analogous provision for elaborating vitamins seems apparent. The chemical and pharmic similarity of some vitamins to the mediators of the nervous system and to the glandular hormones suggests its likelihood. Conversely, stress (nervous malfunction) might not only inhibit such elaboration but also by slight change in the chemical radical, release toxic substances. Such a possibility would offer a fertile field for research. That the concept of supplying artificial vitamins, etc., although accomplishing the purpose for which designed, may not harmonize with the scheme of life is to be considered. It is within the scope of imagination that the well-being of future generations depends, to an extent, upon the adaptability of the present one.

Issue is taken with the belief expressed by Brown[14]: "There is no discriminative sensibility in the sympathetic, its response is urgent, immediate, widespread and explosive as are the responses of the primitive nervous system." This statement does not appear to adhere to the facts. The massive response is present in the threat of physical injury, and of bacterial injury, but is not paralleled entirely. Localized irritations, if insufficient to overflow the threshold of several synapses, exhibit circumscribed vasomotor effects. Vertebral articular perversions often result in apparently very limited sympathetic phenomena.

In health, blushing is a vasomotor reaction limited to the head region. Immersion of a member in fluid of extreme temperature causes local vasomotor response. The confined sympathetic exhibitions in health are numerous and in disease almost limitless. The sympathetic part of the autonomic system may be thought of as releasing a constant stream of impulses ebbing and flooding as the needs dictate while the parasympathetic part functions as do the voluntary nerves only as the occasion arises. Thus it is that activity of the two last named causes the first to flood and the humors released by them to counteract locally those of the first, limiting its sphere.

The theory of presupposing change in electrical potential, polarity or phase as the explanation of the mechanism of the nervous impulse is not inconsistent with the researches of Professor Otto Loewi[17] and Sir Henry Dale[18]. The humoral transmission of nerve impulses as expounded by them contemplates release of humors at the end plate and does not suggest that the nerve fibers are ducts. This theory is altogether compatible with the idea that the release of sympathin (Canon[19]) and acetylcholin is accomplished by hydrolysis, electrolysis or electrosynthesis. These substances are interposed in the conduction mechanism and, having been released, are available for more diffused reaction. The knowledge of their presence enables a further understanding of the neural phenomena. However, if these substances are present in autonomic nerves, analogous humors can be expected logically to function in the mechanism of voluntary nerves. Dale[18] has demonstrated their presence there by experiments which show that acetylcholin is the medium through which striated muscle is activated. Adrenalin and sympathin, hypophysin and acetylcholin, are humors closely related. They further confirm neurological origin of the adrenal and hypophyseal glands.

To accept these findings and carry out their significance to the logical conclusion, would lead to the belief that no muscle is capable of responding to other than chemical means. Now earlier research has shown that muscles do respond to mechanical and electrical stimuli both in vivo and in vitro. The hypothesis that the humor is released as a byproduct of nerve function to be used in a more diffused response is not negated successfully by these findings. This does not belittle the value of the work, but further research is indicated to establish the point. The slight diversity in the pharmacologic action of adrenalin and sympathin is accounted for by the terminal cells of the adventitia. Acetylcholin, antagonistic to the preceding, is more easily accounted for by the suggested theory of electrical potential or polarity as well as by terminal adventitia.

In 1921 Otto Loewi[17] performed an experiment, now classical, in which he demonstrated that as the vagus nerve of the frog's heart was stimulated while the heart was being perfused by an inert physiological solution, some substance passed into the perfusate which when transferred by perfusion to a second heart produced an effect similar to stimulation of the vagus nerve. He later showed that hydrolysis caused its disappearance and that it was destroyed by an enzyme in the blood and tissue juices. Cannon[19] has shown in a similar experiment that a substance released by stimulation of the sympathetic nerve is equally volatile.

A concept of one phase of heart physiology may be set forth on the basis of balanced hydrolysis in that in systole the vasoconstrictor effects released by stimulation of the sympathetic nerve would be hydrolized for the coronary arteries and in diastole for the heart muscle. This would be true of the mediator released

by stimulation of the vagus which in its turn would be made ineffective for the heart muscle during systole. Such a theory contemplates a rapid electrochemical interplay, but may be more acceptable than the supposed presence of vasodilator fibers to the coronary arteries arising from the same source as, and accompanying and intermingling in the same plexus with an augmenter to the heart wall.

In this event the coronary spasm of pseudoangina is susceptible of explanation by assuming excess irritation to the cervical sympathetic ganglion releasing a greater amount of sympathin than is capable of being hydrolized by cardiac activity. Clinical experience, in the relief afforded both by cervical sympathectomy and by manipulation of this region, would confirm this view.

The release of adrenalin by emotion causes the heart to beat faster, raises blood pressure, etc., but an equal release of acetylcholin in the somatic or skeletal muscles insures a local hyperemia. The added availability of sugar at this time is apparently accomplished by a complex chemistry involving the pituitary, liver and pancreas.

The release of acetylcholin stimulates all muscle except that of the circulatory system (heart and arteries) and the region of the bladder and the internal sphincters. This substance is released by the somatic and visceral nerves (the so-called parasympathetic)—vagus and n. erigens, the chorda tympani and the n. lingualis. An excess appears to neutralize the pressor activity or sympathin and in this manner produces vasodilatation.

Activity in any organ, whether muscle or gland, is accompanied by vasodilatation. Except for the heart and arteries, vagusstoff (acetylcholin) is the inaugurater. As this is released both by stimulation of the parasympathetic and of somatic nerves, and as they do not function simultaneously, there must be some reciprocal relation through hormones, enzymes, etc.

In the heart the augmentor and accelerator fibers are from the same source as the coronary vasoconstrictor. It would seem, then, that stimulation of these would at one and the same time lessen the blood supply to the organ while increasing its activity. This is not the case. Release of the mediator sympathin can be expected to cause activity in this type of muscle. However, this may be neutralized or its effects modified by catabolites in the heart wall, or by the perfusate (blood) not releasing the necessary calcium. Starling[20] has shown carbon dioxide to be a powerful local vasodilator. It is probably the presence of lactic acid in the active heart muscle that is responsible for its nutrition being available. Starling further describes carbon dioxide as an universal hormone.

There must be a mechanism by which when skeletal nerves are stimulated the bulbosacral or visceral nerves are inhibited. This, at the same time, produces a constriction of splanchnic vessels and a dilitation of skeletal vessels, which means that the sympathetics are not stimulated in toto. Could it mean that the absence of one mediator permits the functioning of the other or, on the contrary, an increase of one mediator prevents the functioning of the other? The heart and coronary function, although purposeful, might be explained thus.

Skeletal action is catabolic, which means that the thoracolumbar outflow is operating. That the activity of one may be inhibited during the activity of the other must be accomplished through some nervous or chemical means since it takes place almost instantaneously, much faster than can be accounted for through the circulation. The logical means is the longitudinal commissure.

The movements of the alimentary canal from the mouth to the anus are under the control of the bulbosacral outflow. The genitourinary system is controlled also by the bulbosacral outflow. The exceptions to this are the trigone of the bladder and the analsphincter. They are all anabolic in that they are necessary to the repair and replacement of energy and to the elimination of waste; the genital organs are anabolic in the phylogenetic sense; the lungs, as an outgrowth of the foregut, come under the same control.

The heart as an elaboration of the primitive circulation channel is primarily influenced by the dermovascular or thoracolumbar outflow although it receives branches from the vagus. In this case the fibers to the muscle are accelerator.

Since there has been argument, pro and con, over the existence of the vasodilator nerves in the general circulation, a simple explanation might be that the impulses over the vasoconstrictors are held in abeyance. Logic suggests that rather than pressor and depressor fibers to muscular tissues (arteries), the muscles of the tissue are antagonistic in action—similar to a flexor and an extensor muscle in the skeletal system—and that each receives its distinct innervation, the character of which is identical. Muscular tissue responds to stimulation in only one direction and that is to contract; therefore the term vasodilator is misleading as is also the appellation of intestinal dilitation. The only rational assumption seems to be that to effect vasodilatation the nerve impulse travels to the longitudinal muscle fibers and that constriction is carried out by an impulse to the circular fibers.

In the consideration of the nervous system, it is important to remember that it has arisen from the ectoderm and projected itself into other connective tissues and calls forth a response from these to coordinate their actions as environment dictates. For this reason the great preponderance of efferent nerves are derived from the surfaces and the majority of stimuli originate exogenously.

From the lateral ganglia, fibers grow back to join and course with the spinal nerve. If the anatomical description describes sensory connection exactly, no reflexes can take place except through the cord since the sensory fibers are not interrupted in any but the spinal ganglia wherein are located the cell stations. That no effects have been demonstrated, except through stimulation at the central end of a divided white ramus communicans, does not preclude the possibility of receptor cells in terminal or collateral or even lateral ganglia. It does suggest their absence.

Assuming that there are no receptor neurons except as described, the effector neuron must be capable of originating, and must originate, a stream of impulses to the end plates and these must be con-

trolled by a change in potential, originating in the cord and reaching the effector neuron through a connector neuron, or by a raised or lowered threshold to chemical changes (enzymes, hormones, etc.) at the synapse. The latter would argue for a very volatile threshold and would seem to require a much less potent drug than nicotine sulphate for experimental purposes. To fulfill the requirements, the presence of minute quantities of enzymes, hormones, drugs, etc., or a slight change in the calcium and potassium balance, or the presence of the end products of metabolism, is sufficient to hinder or augment the passage of the impulse.

In attempting to trace the pathway of referred pain, motor or trophic reflexes, clinicians and physiologists appear not to have considered the cells of Dogiel which lie in the spinal ganglion and communicate, through the arborization of their dendrites around the cells of the somatic system, impulses from the visceral nerves to the latter which may be interpreted later in the sensorium.

Langdon Brown [14] says:

We can hardly speak of an organic disease of the sympathetic system for we have practically no knowledge of its morbid anatomy. Changes have been described in pellagra but beyond that we can only recognize such things as irritative lesions produced by pressure and destructive lesions produced by trauma or new growth. In general, therefore, we can only speak of diseased conditions expressing themselves through the involuntary nervous systems, without having any clear idea of change there.

This does not take into consideration Nissl's granules. These disappear after such conditions as epilepsy, hyperpyrexia and anesthesia. That they may be a source of energy for the nerve cell, and their disappearance not a true organic change, is admitted. This might be considered as being on the borderline between structural and functional change. The fact that their disappearance is recognizable after such gross nervous disturbances would incline one to the belief that they are at least diminished in minor nerve disturbances if not in the ordinary events of every day. It has been found that they are recovered quickly. Anemia and fatigue have been known to diminish the granules, as has atrophy from disuse. Whether or not this can be considered disease of the autonomic system must be left to the pathologist.

The purpose of the white rami communicantes is to convey to the parts able to furnish it the anticipated demands of the body, i. e., when there is conscious demand for muscular activity and the necessity arises for concentration of energy, this is met by transference of impulses from the central nervous system over the white rami communicantes to be distributed through the ganglia to the arterial system primarily, inhibiting the alimentary system secondarily, and in some animals to the pilomotor. Conscious anticipation of a meal transmits an impulse, probably over the parasympathetics, that results in splanchnic arterial dilatation and augmented peristalsis. The receptor neurons have a more complicated mechanism. The impulses arising in the viscera or parieties travel dorsally, can possibly be interrupted in any of the ganglia and relayed to an effector neuron, and may be transferred by way of the cells of Dogiel and conveyed over the central nervous system to the sensorium, or transmitted to the posterior root, or all three. The gray rami communicantes are not to be confused with the effector neurons which are also gray fibers, i.e., the hunger sensation must be transmitted to the receptor neurons and through the cells of Dogiel reach the sensorium which in an earlier time would mean a demand for physical activity. Under the present state of civilization, the impulse seldom reaches consciousness. It probably by-paths to the posterior root whence it is communicated to the lateral horn and the necessary preparation for digestion is set into motion. Pavlov's conditioned reflexes is an example whereby some action foreign to the idea of food becomes through repetition associated with it and preparation is made to digest it. This, of course, has been carried into other fields of emotion, such as danger, joy, grief, etc., and the autonomic system prepares the organism for the need that the action promises.

That the hormones supplied by the endocrines regulate the body economy and can function independently of the vegetative nerves is not to be denied. Although they may function independently, they probably are subservient to and supplement the autonomic nerves.

The vegetative system is not independent of the water balance, but being autonomic attempts to maintain that balance through the emunctories and through the appetite.

If sensory nerves do not convey the same message under different conditions, is it unlikely that the same thing is true of motor nerves? Sensory nerves do not convey the same message under varying conditions, e.g., if a member is immersed in water at 40 C. and then is brought in contact with water at 30 C., the latter feels cool; but if a member is immersed in water of 15 C. for a few minutes and then is brought in contact with a temperature of 30 C., the water feels warm. Head[2] has described this aptly as biphasic activity. Now that this is so obvious in parenteral sensory nerves, there is no reason to think that it is otherwise in visceral sensory nerves. If this is true, biphasic activity would apply to other changes than those of temperature. A visceral nerve depending for its stimulation on a chemical irritant might well be more or less receptive by continued functioning in a varying concentration of cellular products. This has indeed been observed and the result ascribed to fatigue from too long continued irritation. Fatigue can not be disregarded as a manifestation but it must not be confused with the finer discrimination of a visceral sensory nerve.

Gaskell[12] says:

All the afferent fibers have their nutrient fibers in the posterior ganglia; no peculiarities there exist on the afferent side. The course of sensory fibers is the same in all sensory nerves, viz., directly to the cells of the posterior root ganglia with no connection with any cells in the sympathetic ganglia. Seeing, then, that all the fibers entering into the posterior root ganglia are medullated it follows that all nonmedullated are efferent, none afferent, and that the so-called sympathetic system is not a complete central nervous system, but consists purely of excitor neurons.

This explanation does not seem to be borne out by the experiments of Kuhne[21] or Raymon y Cajal[22]. However, their explanation of the result of their experiments is not altogether conclusive. The fact that the only observable response is to stimulation applied to the central end of a cut white ramus, does not preclude the possibility of a reflex through a sym-

pathetic ganglion if the afferent or efferent fibers are in the same bundle, nor does it preclude the possibility of antidromic conduction of a single fiber, the latter suggested by Kuhne! Since it is impractical, if not impossible, to separate the fibers of the postganglionic neuron for experimentation in vivo it is problematical whether or not this theory will ever be demonstrated. It will have to be accepted as a corollary in a logical sequence.

To promote a conditioned reflex is to establish new pathways in unaccustomed channels. It is perhaps necessary to overcome synaptic resistance. The normal reflex is the most direct path between cause and effect. This is reverted to when through fatigue, pressure, or other reasons, the more complex reflex fails. Once established, the conditioned reflex appears to operate as readily as the normal reflex. Civilization has subjected man to a multitude of conditioned reflexes, not all of which are beneficial. The new pathways are established and what routes they traverse is greatly in need of explanation.

Much of therapy is based on man's reaction to unconditioned reflexes as observed in laboratory animals often anesthetized so that only the most primitive reflexes obtain. This is not comparable to the sick patient in whom all reflexes are distorted and in whom the conditioned reflex may be magnified.

(To be continued)

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Edema — Its Mechanism and Manifestations*

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Tremendous advances in the last two decades mark the increasing importance of laboratory methods in the field of diagnosis, but clinical observation is still the chief asset of the diagnostician and the internist. "The outstanding need of modern medicine," says Pottenger,[1] "is accurate clinical observation and interpretation . . . Too much dependence is put on laboratory findings, while clinical observation is often underrated, often belittled."

Skill in clinical observation demands experience based on thorough knowledge of symptoms, knowledge not only of symptomatic manifestations, but also of symptomatic physiology. Therefore, in a discussion of edema, consideration of the mechanism of its production is of first importance. Only by a thorough understanding of the manner and method of edema production can we evaluate its manifestations in cardiac, renal, and nutritional conditions.

Symptoms are changes in physiologic equilibrium. "A symptom," says Pottenger,[1] "is the manner in which the individual is able to carry on a given function in the presence of a given disease." Accepting this view, edema becomes essentially a disturbance in the water balance of the body, or more particularly, a disturbance in the free and equal flow of water from plasma to tissues, from tissues to plasma.

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Two aspects of water balance are to be considered: (1) balance between ingestion and excretion; and (2) balance in fluid exchange between blood and lymph. Edema is essentially a disturbance in both, but the former is secondary and contributory only. It is rather a result than a cause of edema, and while it must be considered therapeutically, it is only the plasma-lymph balance which concerns us in a study of the mechanism of edema production.

There is no better approach to the abnormal than by way of the normal, so let us consider the mechanism by which the body normally maintains balance in fluid interchange between the plasma and the tissue fluids. Briefly stated, this balance is maintained by a physicochemical equilibrium between the hydrostatic pressure of the capillaries and the effective colloidal osmotic pressure of the plasma proteins. Hydrostatic pressure tends to force fluid (and electrolytes) from the plasma to the tissues; osmotic pressure of the proteins is effective in drawing water back from the tissues into the blood stream. Thus osmotic pressure maintains the balance and prevents accumulation of excess fluid in the tissue spaces.

Hydrostatic pressure (or capillary blood pressure) not only is variable in different regions of the body but also it differs greatly as between the arteriolar capillaries and the corresponding venous capillaries of any particular region. For the purpose of

illustration we shall consider that of the skin. As determined by Landis,[2] this pressure amounts to 32 mm. Hg. in the arterial capillary bed and 8 mm. on the venous side. This gives an effective hydrostatic pressure of 24 mm. Hg.

In considering osmotic pressures as between plasma and lymph, it is necessary to note the difference in composition. Plasma, of course, is whole blood minus the formed elements; it is the fluid content of the blood. Lymph is a transudate occurring in the intercellular spaces, serous cavities and lymph vessels and normally contains very few cells. The corpuscles in either case exert only a negligible osmotic pressure because of their large size, and may be completely disregarded. The essential difference in plasma and lymph lies in protein and electrolyte content. Starling[3] is said to be the first to recognize that electrolytes freely diffuse through capillary membranes, but that proteins are nondiffusible. He was also first to postulate the controlling effect of protein osmotic pressures on fluid interchange. Being freely diffusible, electrolytes arrange themselves in such a manner that the total plasma is equal to total lymph, but individual concentrations of bases and chlorides vary in accordance with Donan's theory of membrane equilibrium.[4] Since the total electrolyte content is equal, the osmotic pressure exerted by electrolytes is also equal. This pressure has been determined experimentally by various investigators as averaging 6.5 atmospheres or 4940 mm. Hg. This amounts to a pressure of nearly 100 pounds to the square inch of membrane, a tremendous pressure, but entirely ineffective in controlling fluid flow because of the equality on the two sides of the capillary membrane.

Plasma proteins, on the other hand, exert a comparatively infinitesimal but effectively important osmotic pressure of only 28 mm. Hg. Proteins being nondiffusible occur in different concentrations in plasma and lymph. As determined by Heim[5] the protein content of plasma is 6.18 per cent; that of lymph averages 3.32 per cent which gives a lymph-plasma ratio of 54/100. The osmotic pressure of the plasma proteins as determined by Krogh[6] is 27.94 mm. Hg. Experimental evidence of other investigators, in the main, confirms this figure, so for purposes of illustration let us take the round number 28 mm. According to the lymph-plasma ratio of 54/100, the osmotic pressure of lymph proteins is approximately 10 mm. Hg. Subtracting lymph (10 mm.) from plasma (28 mm.) we find there is an effective colloidal osmotic pressure of the plasma proteins amounting to 18 mm. Hg. It should be remembered that there are regional variations for these figures, but for our purposes they are average and adequate.

On the basis of the above, it can be seen readily that on the arterial side of the capillary bed, there is an excess in hydrostatic pressure over osmotic pressure of 6 mm. Hg., which may be considered as a driving force tending to move water from the plasma into the tissue spaces.

Arterial Capillary Bed:	
Hydrostatic pressure of plasma	32 mm.
Hydrostatic pressure of lymph	8 mm.
Effective hydrostatic pressure	24 mm.
Effective osmotic pressure	18 mm.
Effective drive	6 mm.

With the passage of water out of the plasma, the plasma proteins become somewhat more concentrated, thereby increasing osmotic pressure; and as the blood flows through the broadening capillary bed the effective hydrostatic pressure falls to as low as 12 mm. Hg. Thus on the venous side of the capillary network, there is an excess of osmotic pressure over hydrostatic pressure which in effect draws the water back into the blood stream.

Venous Capillary Bed:	
Effective hydrostatic pressure	12 mm.
Effective osmotic pressure	18 mm.
Effective pull	—6 mm.

Attempts have been made to explain fluid interchange and control on other bases, such as central nervous control, hormonal control, influence of electrolytes on capillary permeability, hydration and dehydration of tissue cells, etc. All these theories were discussed by Elwyn in 1929,[7] and while these mechanisms undoubtedly do affect intake and output balance, and also are to be considered in certain edemas, we can find, in recent literature, no considerable importance attached to them as primary factors in fluid exchange or edema production.

Thus the mechanism of fluid exchange may be summed up as:

(1) Hydrostatic pressure causes water to flow from the plasma to the tissues.

(2) Colloidal osmotic pressure of the plasma proteins maintains the balance by causing the return of water to the blood vessels.

In the words of Landis,[8] "The gradient of capillary pressure is balanced against the colloidal osmotic pressure in such a way that under average conditions the filtration occurring in the arteriolar portion of the capillary network is balanced by absorption in the venous capillaries and minute venules."

Disregarding, then, possible secondary factors and also disregarding edemas caused primarily by lymph stasis as in elephantiasis, we can best explain the mechanism of edema as a primary disturbance in the hydrostatic-osmotic pressure equilibrium.

Defining edema simply as a retention of fluid within the intercellular spaces, serous cavities and lymph channels, one can see readily that an increase in hydrostatic pressure or a decrease in osmotic pressure will cause such retention. And this is exactly what occurs in the three principal conditions, congestive cardiac failure, renal disease, and nutritional deficiencies, of which edema is an important manifestation and symptom. We shall, for the sake of clarity, confine our discussion to each as a separate entity and the accompanying edema as a particular symptom, but it should be mentioned that often all three conditions tend to merge and become a part of the picture, as is instanced in the albuminuria which so often complicates circulatory failure, and the conditions of anoxia and nutritional disturbance which are superimposed upon the cardiorenal syndrome.

Cardiac Edema.—Cardiac edema is due primarily to increased venous pressure which accompanies congestion resulting from the failing power of the heart. The increased hydrostatic pressure overcomes the normal osmotic pull and fluid remains in the tissues. This edema is of the gravity type because the increase

in hydrostatic pressure is essentially due to back pressure and is therefore greatest in dependent parts. If the patient is ambulant or orthopneic, the edema usually occurs earliest in the feet and legs and may assume large proportions before ascites or general anasarca develops. In fact a cardiac anasarca is usually a result of kidney complications.

Localized edemas due to venous obstruction, such as tumor pressure, are produced in a similar manner, that is, by an increased hydrostatic pressure. This is true also of the ascites of portal obstruction. Other factors often contributing to, and complicating the edema picture in congestive heart failure are anoxia and chloride retention. In advanced cases anoxia may damage the capillary membrane and thereby increase its permeability to protein; however, definite experimental evidence of this is lacking. Plasma and lymph protein determinations in cardiac edemas are inconsistent and therefore inconclusive. On the other hand, it is definitely known that salt retention often occurs in the edemas, renal as well as cardiac, that salt administration accentuates the accumulation of fluid in the tissues, and salt restriction favors withdrawal of edematous fluid and diuresis. Increase in total body chlorides promotes an increase in total body fluids and thereby accentuates the edema. While chlorides cannot be considered as a part of the primary mechanism, they are an important contributing factor, and therefore demand therapeutic consideration in the form of dietary restriction.

Renal Edema.—Renal edemas are due primarily to a reduction in the colloidal osmotic pressure of the plasma proteins, but a difference in the picture of the mechanism of acute glomerular nephritis and that of nephrosis demands individual consideration and emphasizes the necessity for diagnostic and therapeutic differentiation.

In nephrosis, the reduction in colloidal osmotic pressure is due entirely to loss of albumin in the urine, while in nephritis there is the additional factor of increased permeability of the capillary network permitting loss of protein to tissue fluids. The pathology of nephrosis consists of damaged tubular membranes and clinical and chemical investigation gives the picture of massive edema, a very high albuminuria (in one case in our clinic 7 per cent), a hypoproteinemia and a normal or lowered lymph protein content. The hematuria, oliguria, uremia and hypertension which characterize nephritis, is lacking in nephrosis. The edema of nephrosis is so constant and characteristic that Leiter[9] has said, "Without edema there is no nephrosis." This edema results from the hypoproteinemia produced by loss of albumin in the urine. This was first recognized by Epstein,[10] who introduced the apparently beneficial high protein diet in the treatment of nephrosis.

Perhaps here we should mention the relative affects of albumin and globulin on plasma osmotic pressure. Normally the albumin-globulin ratio is nearly two to one and the albumin molecule is only half the size of the globulin molecule. Since osmotic pressure is a function of the number of molecules of solute per unit volume of solvent, it is obvious that albumin accounts for nearly four times the osmotic pressure globulin does. The smaller size of the albumin molecule allows for greater diffusibility when capillary permeability is increased, which explains the fact that urinary protein is practically all albumin.

In some unknown manner, probably due to a toxic factor, there is in acute glomerular nephritis, an increased permeability of all capillary membranes which allows albumin to diffuse so that in addition to a loss of plasma albumin by way of the kidneys, there is also a loss to the lymph with a resulting hypoproteinemia and a high lymph protein concentration. This naturally reduces or destroys the colloidal osmotic power of returning fluid to the tissues.

The early manifestation of renal edemas, either nephritic or nephrotic, characteristically is a morning edema of the eyelids, but it should be noted that occasionally it occurs earliest in the feet. In either case it rapidly becomes generalized. In acute renal conditions, edema need not concern us greatly unless massive, for an acutely inflamed kidney needs rest and the edema temporarily removes some of the load of the injured kidney. But often the edema assumes proportions demanding attention other than that directed to the kidney itself and here we find that salt and water restriction is imperative. The so-called lymphatic pump procedure has proved a valuable osteopathic aid in both cardiac and renal edemas.

Nutritional Edema.—Nutritional edema results from lowered colloidal osmotic pressure of the plasma occasioned by the hypoproteinemia which results from a deficiency in the diet, or failure to digest, absorb or metabolize protein.

Cases of nutritional edema were so numerous among the victims of the Great war that the terms, war edema and famine edema, were coined for this condition.[11] In fact most of the research on this subject has been subsequent to the Great war. But it should be remembered that nutritional edema may result not only from starvation, but also from rigid dietary restrictions of protein or as a consequence of diseases which disturb digestion, absorption or metabolism, such as pernicious anemia, pellagra, tuberculosis, scurvy, beriberi, diabetes mellitus, chronic dysentery or cardiac and renal disease.[12] In average practice the physician seldom sees starvation, but it is in the other conditions named that he should be most alert to the possibilities of lowered blood protein resulting in edema.

Another condition, not necessarily nutritional, which may result in hypoproteinemia and edema, is liver disease. Here we do not refer to portal obstruction, but to the inability of the liver to manufacture serum albumin and globulin when there is an extensive loss of liver tissue as may occur in cirrhosis, acute yellow atrophy, or phosphorus poisoning. Malnutrition or liver disease should always be considered as possible causes of rare and intractable edemas which cannot be explained on the basis of circulatory failure or renal disease. Formerly these conditions were often diagnosed as idiopathic edemas, but comparatively recent studies of plasma protein concentration have revealed the cause to be hypoproteinemia.

SUMMARY

1. Edema is a symptom, not a disease.

2. Edema is an alteration of fluid interchange between the blood and tissue fluids, such that retention of fluid occurs within the intercellular spaces, serous cavities or lymph channels.

3. In general, edema results from:

(*a*) increased hydrostatic pressure consequent to congestive circulatory failure due to cardiac disease or local obstruction.

(*b*) decreased osmotic pressure of the plasma proteins consequent to the hypoproteinemia resulting from loss of protein to the urine, lymph or both; in renal disease, from malnutrition of starvation or metabolic disturbances, or from the inability of the liver to form serum proteins.

4. Chloride retention is not a primary cause of edema, but is an aggravating secondary factor often necessitating therapeutic consideration in the form of dietary restriction.

Edema may be considered as a part of the protective mechanism especially in acute renal disease and demands special therapeutic consideration only when massive in proportions or prolonged beyond the usual clinical period of time.

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The Application of Physiology in Surgery*

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One teacher used to say that nerve and a thorough knowledge of anatomy would make a good surgeon. I would add to that a very strong groundwork in both physiology and pathology as being absolutely essential for the good surgeon. It would be well for all surgeons to read more physiology.

It is useless to tell a third year student that physiology should be studied because it is the cornerstone of medicine and surgery and not to be forgotten like a dream. However, when the student begins to work in the wards he realizes that physiology is of great importance. He then sees that there is a reason why a patient in surgical shock is both pale and covered with cold perspiration. We shall now endeavor to apply a science to an art—the science of physiology to the art of surgery.

The lengthening and improvement of life must ever be the great purpose of the surgeon. The physiologist is interested more in the origin and nature of life, while to the individual it is his or her most treasured possession. Life is considered synonymous with the power or ability to do something, McDowell tells us; while Crile says it is the transformation of energy.

Before the full power of doing external work is attained, the human organism passes through a series of stages during which this power is limited. At first the organism is capable only of growth. The various parts function. The heart muscle beats at about the fourth intrauterine month. The maternal blood, however, takes care of the metabolic products and supplies all the nutrient material. At the seventh month the fetus has attained sufficient development so that, under favorable conditions, it could maintain a separate existence; at nine months it has full fetal maturity, and at birth it is called a child.

Now it is responsible for itself as far as digestion, respiration, metabolism and excretion of waste products are concerned.

Life, McDowall says, as a clinical entity must be considered to center around the circulation and respiration. The raising of blood pressure in the coronary arteries will start the heart beat. The essentials of life are heart action, supported by body heat, adequate respiration, blood pressure, and the maintenance of approximate blood neutrality. All forms of death are due to failure of one or more of these factors. Then there are those mechanisms required for digestion, absorption, metabolism, and their control; control of the water content, temperature of the body, and the elimination of the waste products. The body dies, more slowly to be sure when these factors fail, but most assuredly just as certainly. The kidneys are liable to infection, acute nephritis; the intestinal tract to ulcer, obstruction, etc. The maintenance of normality in these organs is essential to life and added to this is the ability of the body to produce immunity to bacterial invasion. Besides this the organism has the ability to feed itself and protect itself due to the presence and function of the brain.

When life is considered in the wider aspect, we find that all body tissues are to be included because the body is an integrated whole and appears to be designed to carry out physical work in some form or other. We become painfully aware of how far civilization has led us from the purposes for which the larger portion of our bodies was apparently designed. It is essential that in the development of our mental qualities we do not lose sight of the lower physical qualities which have helped in our evolution and are

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still needed now, when excessive mental activity has come to take the place of physical activity. Massinger says, "Death hath a thousand doors to let out Life."

Sensation.—All sensations are received by the receptor organs adapted for the variety of impulse they are intended to receive. For example, the receptors which exist in the organs of special senses such as sight and hearing are but nerve endings of a highly specialized kind. We have a number of organs which respond to vibration in the ether. Some waves we hear as sound through the auditory apparatus; the spectrum we visualize as various colors by our eyes, the longer infra-red rays we appreciate as heat. The very short ones we call x-rays. Each nerve ending is insulated from every other. Much depends on Meissner's corpuscles on the palmar surface of the fingers. In the skin there are sensations of touch, pain, heat and cold.

The Sense of Pain.—Pain is not dependent upon special receptors but upon the amount of harmful stimuli present. The pain at McBurney's point usually is a referred one from the appendix. The pain in the urethra usually is from vesical calculi. The pain is not in the tissues themselves, but is a disturbance in those nerve cells in the brain, the function of which is to receive stimuli conveyed by the afferent nerves from that region. Pain is of two kinds: actual and referred. Of the former may be mentioned pain from harmful stimuli to the skin, mucous membrane, skeletal muscles, periosteum, tunica vaginalis of testicle; of the latter all the viscera except serous coat of testicle. It is generally considered that there are no sensory nerves for pain in the viscera and these organs may be cut without anesthesia. However, a pull on the peritoneum is very painful, as we often observe while operating under local anesthesia. The reason why the passage of stones is so painful is because of the stretching of the ureter. Take the pain in an ulcer of the stomach: the patient locates it in the abdominal wall in the epigastric region. It is located in the upper epigastric region if the ulcer is in the cardiac end of the stomach; and in the lower epigastric region if at the pyloric end, even while we realize that the stomach lies transversely rather than vertically. In addition the patient tries to describe a pain which he feels in the region of the back on either side of the seventh and eighth thoracic vertebrae. McKenzie says that sensation of pain from whatever source the stimulation arises, is referred to the peripheral distribution of sensory nerves in the external body wall. Gallstone pain is felt between the shoulders, while that of renal calculi radiates down the thigh. Diaphragmatic pain is referred to the fifth cervical segment from which the phrenic nerves arise.

Colic such as caused by the passing of gallstones, or renal calculi, or irritation of the intestine, is characterized by its intermittent nature. This is used to differentiate it from inflammatory pain. Rovsing's sign, i.e., pressure over the descending colon elicits pain over the appendix region, is another test for differentiating colic from acute appendicitis.

When the appendix is swollen, the fact that the pain in appendicitis may be due mostly to its muscular spasm is very important in relation to abscess formation. When this occurs and the muscles become paralyzed by the toxin, or the appendix ruptures, the pain ceases unless the parietal peritoneum has become involved.

The disappearance of pain may suggest recovery, but the reverse is usually true, and we endeavor to operate immediately before general peritonitis sets in. Experience shows that there is 5 per cent higher mortality for every hour operation is postponed.

Local palpation, the pulse rate, and possibly the temperature, increased white count, and presence of vomiting, are of the utmost value in diagnosis. Although smooth muscle cannot be thrown into tetanus in the ordinary way, it is nevertheless capable of entering into sustained contraction. The normal contraction may become exaggerated to the extent that it can be considered a spasm. This is common at the cardiac and pyloric ends of the stomach.

The uterine contractions in labor are similar. The tension of the muscle is responsible for the pain, rather than the contraction, since there is no pain after delivery, when the uterus may be made to contract quite markedly by manual massage as is often done by obstetricians to prevent hemorrhage.

Circulation.—When a muscle becomes active, lactic acid and carbon dioxide are produced together with substances which cause a dilatation of capillaries. Some authorities say that histamine is responsible. Reflex mechanisms are capable of dilating vessels in active tissues. The stimuli arise in the active organ itself and by reflex action bring about a diminution of arterial tone. Now if certain tissues take more blood in this way, and the amount of blood in the body is limited, it is essential for those organs which are not required to close down. Carbon dioxide acts on veins and arteries indirectly by virtue of its action on the vasomotor center in the medulla (Henderson). Lack of carbon dioxide has the opposite effect and may be one of the causative factors in surgical shock. This condition of shock is an interference with the most fundamental mechanism of life, namely, the transformation of energy; it is characterized by a marked fall of blood pressure, blanching of the skin, feeble pulse, sunken eyes, prominent cheek bones, shallow respiration, subnormal temperature, and the patient pays little or no attention to outside influences. Besides the theory that lack of carbon dioxide causes surgical shock, there are other known causes, such as too many stimuli coming in from burned or badly injured tissue, severe hemorrhage, absorption of histamine, too prolonged an operation, too much anesthetic, individual susceptibility, etc.

The result of some of these is an exemia or draining of blood from peripheral vessels to large vessels in the interior of the body, changes in the blood chemistry, etc. The treatment is remove the cause as quickly as possible by (1) arrest hemorrhage, (2) restore body temperature, (3) relieve pain and restlessness, (4) raise blood pressure by restoring blood volume, by giving freely of liquids by rectum and mouth—hypodermoclysis of glucose or the Bayliss' gum salt solution, (5) transfusion of whole blood. Blood should be given early. Too rapid a blood transfusion—given in 5 to 10 minutes—may cause a fall in blood pressure so we give blood slowly, taking from 40 to 75 minutes.

Prophylaxis against operative shock is very important and we put the following into practice: (*a*) quick, clean incision, (*b*) protection of viscera from exposure, (*c*) crushing, tearing, or pulling of tissue reduced as much as possible, (*d*) avoidance of mental excitement, (*e*) use of Crile's anoci-association in

which all tissues are infiltrated with local anesthetic before being cut, (*f*) watching the blood pressure because the tissues are supplied with blood by the diastolic pressure. (If the systolic pressure drops below 80 millimeters of mercury, the patient probably will not recover without treatment, and if the systolic pressure drops below 60 millimeters, he probably will die despite treatment.)

Vomiting.—Vomiting usually is preceded by a sensation of nausea. The patient feels weak and exhausted; he is pale and breaks out in cold perspiration; salivary flow is increased, pulse becomes weaker and respirations irregular and weaker. Cannon says that before vomiting takes place, the pylorus closes tightly while the cardiac portion relaxes.

During the deeper respirations, and with relaxation of the cardiac valve, the stomach contents enter the esophagus and move up and down with respiration. Finally the diaphragm and the abdominal muscles contract at the same time and the contents in the esophagus are ejected. As soon as the experience is over, the stomach closes down on the retained contents, a period of relief ensues, and any contents left in the esophagus empty into the stomach. The ache left in the stomach region after vomiting is not due to the result of the stomach wall's activity as has been thought, but to the exhaustion of muscles of abdominal wall and diaphragm.

The causes of vomiting are many: (1) local diseases in pons and medulla, (2) increased intracranial pressure, (3) various drugs, tartar emetic, digitalis, etc., (4) presence of disagreeable or poisonous stomach contents, (5) referred irritation (from appendicitis, gastritis, gastric carcinoma, intestinal obstruction), etc.

Constant vomiting such as occurs in intestinal obstruction empties the stomach first, then bile is noted in the vomitus, and then contents of the small intestine. This soon leads to dehydration and starvation. The surgical treatment is gastric lavage to clean out any irritating content, removal of appendix, gall-bladder or other cause, use of Rehfuss tube to take strain off the stomach and to make it easy to keep fluid in the stomach, wash out toxins and prevent regurgitation pneumonia.

Until recently we have thought that a posterior gastroenterostomy made it easy for the contents of a stomach to be dropped into the small intestine. Cannon and Dragstedt have pointed out that the food content of the stomach was intended to be pushed through the pylorus by the peristaltic action of stomach muscle, and that only when a partial gastrectomy is done at the same time does the new opening function perfectly. These authorities say that when the gastroenterostomy is done near the pylorus where the pressure is greatest and the content mostly fluid, then the new opening has a good chance to function. This operation is performed to relieve gastric and duodenal ulcers when conservative treatment has failed, and in the presence of pyloric stenosis. A stomach outside the body would drop its contents through the new opening by gravity, but the stomach and jejunum are only a small part of the abdominal cavity content. All the other organs are soft, pliable, usually full of fluid and the pressure is equal in all directions. This is the reason we have had such excellent results in posterior gastroenterostomies for the relief of pyloric stenosis in the adult. Pylorospasm in the infant, on the other hand, requires a longitudinal section of pylorus through the serosa and muscularis, leaving the mucosa untouched. (Ramstedt operation.) This spasm is a contracture of the muscle physiologically and no structural disorder is present. Stenoses also occur in infants and the Ramstedt operation is the one of choice. Obviously a posterior gastroenterostomy is neither necessary nor desired.

Obstruction.—The physiological considerations in intestinal obstruction are many and varied.

The great Murphy, while operating one morning, drew the attention of his onlookers to the circulation around a malignant mass and said, "Gentlemen, this proves the statement of Still, namely, that the rule of the artery is supreme." It is well known that mere obstruction in the absence of interference with circulation to the intestine produces, aside from constipation, relatively few symptoms. Indeed, symptoms of obstruction vary with the location of the obstruction, that is, high or low in the tract, and the degree of interference with the circulation to the gut. The higher the obstruction the greater the intensity of the symptoms. When the obstruction is near the openings of the pancreatic duct or ampulla of Vater, the symptoms are *most* marked, as pointed out by Brooks, the Dragstedts, and their co-workers. Owings, McIntosh and Stone pointed out the fact that following obstruction intra-intestinal pressure is greatly increased due to secretion of fluid, and as there is much more fluid than normally secreted by the mucosa of the stomach and duodenum, plus the biliary and pancreatic additions, the reason for the marked symptoms is clear. The duodenum secretes ten times as much as the ileum in a given time and the amount depends upon peristalsis.

Millet and Lang have pointed out that the intramural blood supply differs in various parts of the tract, and as a result pressure within the intestine exerts different influence on the blood supply to the intestine. In the duodenum any increase in the intra-intestinal pressure exerts great pressure on the blood vessels which lie between the musosa and the muscularis, while in the colon the vessels are outside the muscularis and are therefore little influenced by intracolonic pressure.

The result of simple obstruction in which there is no interference with the circulation is merely dehydration and loss of chlorides from vomiting. Heartwell and Hogust, believing dehydration was the cause of death in these cases, kept animals alive long periods by the administration of sodium chloride solution. Haden and Orr observed that the blood changes were a decrease of blood chloride and an increase in the carbon dioxide combining power.

There are two types of obstruction: paralytic or adynamic ileus and mechanical or obstructive ileus.

Theories as to the causes of the symptoms in obstruction are:

(1) Intoxication Theory—absorption of toxin formed within the bowels, causing characteristic signs. This may be from food, bacteria, or destruction of mucosa.

(2) Nontoxic Theory—

(*a*) Dehydration—always present where vomiting has been excessive.

(*b*) Blood changes—there is an increase of carbon dioxide combining power, increase of urea

nitrogen and a decrease of plasma chlorides. These are the causes of all symptoms say Haden and Orr, Gatch, Trussler and Burgess. The toxin is supposed to be a histamine according to Gatch and Pale; a proteose according to Murphy and Brooks; and a neurin according to Nesbitt.

The application of these theories from the surgical aspect calls for (1) early diagnosis, (2) speedy treatment, (3) adequate postoperative care. Diagnosis is made from the history and the physical findings. As soon as diagnosis of obstruction is made, the abdomen is opened. If the patient cannot stand resection of the gut, an enterostomy above the obstruction is done, and large quantities of saline solution administered intravenously and by hypodermoclysis when dehydration is marked. Glucose 5 per cent in 0.9 per cent saline or 10 per cent glucose in 1 per cent of saline is used. Gastric lavage is recommended to keep the stomach empty of toxic contents. A number 9 Rehfuss tube is kept in place in the duodenum. Spinal or local anesthetic is used.

Following the operation nothing is given by mouth until the bowels move. The administration of fluid by intravenous and intramuscular routes is continued. The abdomen is heated with hot boric packs kept warm by the use of deep therapy light. Frequent blood chemistry examinations should be made. The patient's condition should be watched closely. Blood transfusions are very helpful and will often bring the patient out of danger.

ANESTHESIA

Anesthesia is defined as loss of sensation. General anesthesia is loss of sensation which affects the whole body.

Local or regional anesthesia is loss of sensation in a part of the body. General anesthetics, Mayer Overton says, are fat solvents which enter the blood stream after mixing with inhaled air (in inhalation anesthesia) or directly (when intravenous anesthesia is used) and form a loose physiochemical combination in the lipoid bodies of the central nervous system, which prevents the power of reception and conduction. Fat solvents diffusible in oxygen are narcotic to living cells.

A person under anesthesia must be watched for:

(1) Cessation of breathing (apnea) which leads to asphyxia. In this condition there is an increase of carbon dioxide in the blood, first a stimulation of respiration and cardiac centers in the medulla, then acidosis, cyanosis, paralysis of the same centers and death.

(2) Acapnea, a condition of diminished carbon dioxide in the blood—Carbogen must be given to stimulate respiration or death results from shock.

(3) Hypercapnia, an increase of carbon dioxide beyond 35 per cent. (Carbon dioxide up to 22 per cent stimulates blood pressure; carbon dioxide up to 35 per cent stimulates respiration.)

Cells of the body suffer from acidosis in this condition and the body's neutrality is upset. Carbon dioxide is acid, but in the blood it is loosely combined with alkali to maintain the body's neutrality or slight alkalinity. The equilibrium is maintained by (1) exhalation of carbon dioxide, (2) excretion of acid salts by the kidneys, (3) presence of buffer salts (phosphates and bicarbonates) in the blood, and (4) changing of urea into ammonia.

The carbon dioxide combining power of the blood plasma is 50 to 65 per cent. If it is 40 per cent the patient's condition is serious; below 35 per cent the patient is in danger of losing his life.

Ether causes an immediate fall in blood pH (hydrogen-ion concentration) and bicarbonate content, leading to uncompensated acidosis if prolonged. Ketosis develops several hours later due to the upset of carbohydrate metabolism from interference with the insulin secretion. In jaundice the liver still further loses its protein detoxicating power under ether. Elderly patients are affected by ether much more seriously than younger people.

Nitrous oxide causes deficiency of oxygen content of blood (known as anoxemia) and an increase of pH.

Ethylene causes less deficiency of oxygen and is by far the safest of anesthetics especially when oxygen is added.

Local anesthetics have little or no effect on the blood unless used in very large doses.

The symptoms of acidosis are fatigue, nausea and vomiting, gas pains, coma. Unless something is done, death intervenes.

Conditions favoring uncompensated acidosis are extremes of age, kidney dysfunction, exhausting diseases, sepsis (prolonged), prolonged anesthesia. In shock there is always an uncompensated acidosis.

If the patient shows a low bicarbonate content in the blood before operation, he should have sodium bicarbonate solution by means of the Murphy drip. The detoxicating function of the liver is bolstered by administration of glucose.

Complications.—Postoperative pneumonia occurs usually from prolonged anesthetic. This goes for spinal, local, intravenous, rectal and inhalation anesthesias.

Before operating the surgeon should find out how high the patients' pulse pressure is because pulse pressure divided by diastolic pressure equals the index for operability (Moot's Index) 50 per cent is normal, 75 per cent is high, and 25 per cent is low.

In prolonged operations ethyl chloride is the most dangerous, chloroform next most dangerous, and nitrous oxide with oxygen next most dangerous; ether is less dangerous, ethylene and oxygen least dangerous.

Local anesthetics work by the abstraction of heat, (ethyl chloride), by chemically interrupting nerve conduction (cocaine, novocaine, quinine), and by protoplasmic poisoning.

Some physicians feel that there is entirely too much surgery done. The reason so many patients feel well after surgery is not because the surgery was necessary, but because of the care given before the operation, the complete physiological rest in the hospital, and the extraordinary care taken of them by their friends, and by themselves after the operation.

In Germany, Schilling has divided the polymorphonuclear neutrophiles into five groups. He watches the ratio, in numerous counts, shift from what is known as right to left, or vice versa. In America the pathologists are satisfied with three groups of myelocytes, namely:

(1) Those immature ones the nuclei of which are round.

(2) The middle-aged ones, the nuclei of which are held together by bands.

(3) The older ones, the nuclei of which are held together by filiform material.

These counts should be made in the morning on a fasting patient due to the fact that following the ingestion of food, there is a physiological leucocytosis, which would obviously ruin the efficacy of a scientific study of the blood count.

In the beginning of the disease there is a shifting towards the immature groups (shift to left). When the condition is at a standstill, there is no variance. But if the patient's condition is progressing satisfactorily, there is a shift to the right or toward the filiform group. If, on the other hand, the patient's condition is getting worse, the shift is toward the left or back to the immature group.

Thus the surgeon needs to pay less attention to the total count when a more reliable check is at his disposal.

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"While medicine is to be your vocation, or calling, see to it that you have also an avocation—some intellectual pastime which may serve to keep you in touch with the world of art, of science, or of letters. Begin at once the cultivation of some interest other than the purely professional. No matter what it is—but have an outside hobby. For the hard working medical student it is perhaps easiest to keep up an interest in literature."—Osler, quoted by William Clark Danforth, M. D., in "The Humanities and Modern Medicine."

Clinical Application of the Blood Sedimentation Test*

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The phenomenon of blood sedimentation is not new, in fact it was observed by the ancients. From time to time its use in diagnosis of disease has been revived and then laid aside. During the last ten years over eleven hundred references have appeared in the "Quarterly Cumulative Index Medicus." These references cover every phase of the problem of blood sedimentation from the standpoint of history, procedures, research, and clinical application, all of which clearly attest its importance, limitations, and stability as a diagnostic and prognostic aid. There seems to be no sign of the interest in blood sedimentation abating. In fact, there is an abundance of literature on the subject in almost every language. Therefore, it is the purpose of this paper to summarize this wide variety of information so that it may be understood more clearly and applied by the clinician.

History.—In ancient times, Galen observed that the blood would separate into layers upon standing—serum and clot; and that in certain diseases additional fluid layers would appear before clotting took place. This separation of the "humors" was at that time thought to be a cause of illness, with treatment directed toward the removal of the "phlegma layer" from the body.

John Hunter, in 1797, is credited with observing the speed of erythrocyte sedimentation and noting that it was increased in individuals with inflammatory lesions. He also believed the rate to vary with the severity of infection.

This same behavior of the red cells was alluded to by Nasse, 1836; Davey, 1839; Müller, 1844, without explanation.

It was not until 1917 that Fahraeus[1] revived an interest in it and in 1920 Linzenmeier[2] worked out a technique of blood sedimentation. The use of the test in obstetrics and gynecology has been reported by Friedlander,[3] Polak and Mazzola.[4] Cutler[5] and others pointed out the usefulness of the test in rheumatic fever and tuberculosis. From these initial pronouncements there has spread an avalanche of coherent literature to the present time, with an ever-increasing demand for sedimentation readings as a part of standard clinical laboratory procedures.

Physiology.—The blood cells are suspended in the viscous plasma and are kept in even distribution by the constant movement of the fluid within the vessels. If an anticoagulant is added to a sample of blood

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drawn from a vein and the mixture placed in a slender graduated tube, it is found that the erythrocytes tend to remain suspended in the plasma—"suspension stability." Under certain pathological conditions, the red cells will gradually settle toward the bottom leaving a clear layer of plasma at the top of the tube. The rate at which the cells settle is called the "sedimentation rate." The rate is measured by the depth of clear plasma in millimeters at the top of the tube by taking the reading at the end of one hour. The normal sedimentation rate in men is only 1 to 3 millimeters an hour, in women 4 to 7 millimeters, and in the newborn 0.5 millimeters. Among the outstanding pathological conditions in which the sedimentation rate is increased are septicemia, in which it rises to 100 millimeters an hour, and pulmonary tuberculosis, 65 millimeters an hour. Thus, the suspension stability of the blood is reduced.

Information in regard to the physiological nature of the phenomenon is still somewhat fragmentary. Four factors have been investigated[6]: (1) *specific gravity* of the plasma as compared with that of the corpuscles, (Corpuscles of high specific gravity would sink more rapidly in normal plasma, and normal corpuscles would settle more quickly in plasma of a low specific gravity. This has been proved to be the case.); (2) *lowered viscosity* of the plasma, (not proved); (3) *increased size of corpuscles,* (This would increase their mass disproportionately to their surface and consequently cause them to settle more rapidly —not proved.); (4) *clumping* together of cells of normal size producing more rapid settling.

This fourth factor seems to carry the burden of proof in regard to the cause of increased sedimentation rate in disease. There seems to be an increase in plasma proteins (fibrinogen and globulin) which act upon the erythrocytes in an as yet undetermined manner, causing them to form clumps of agglutinated cells which settle more rapidly than in normal blood. This feature may be observed by comparing thin films of normal blood with that having a rapid sedimentation rate under the microscope. Normal blood forms an even, homogeneous film on a glass slide, while the abnormal film will be rough and granular with the red cells agglutinated. Thus, the explanation of blood sedimentation is "shunted for further investigation" while we proceed to apply the test in diagnosis and prognosis of disease processes in the body.

Technique.—The sedimentation rate may be determined by a number of procedures. As yet, no single method has been adopted as standard. Although the differences in procedure are simple, collectively they may prove confusing in final evaluation. The principal tests are the Linzenmeier, *Westergren, Cutler,* Wintrobe, Landsberg, Landau, and Brooks.[7] In this country the Westergren and Cutler procedures have proved to be most popular and are in more general use. Any standard text on laboratory procedures fully describes most of these methods. Only two procedures will be given here:

WESTERGREN METHOD

Materials:

Westergren pipette, 200 mm. in length, 2.5 mm. in diameter, graduated in mm.

Westergren rack.

Tourniquet.

Sterile 2 cc. syringe.

Sterile 3.8 per cent solution sodium citrate.

Alcohol, sterile sponges, etc.

Watch glass.

Technique:

Draw sodium citrate solution into syringe to the mark 0.4.

Enter vein and draw blood into syringe up to 2 cc. mark.

Remove needle from syringe.

Draw back plunger of syringe, and tilt back and forth several times to insure mixture of blood and citrate.

Eject contents of syringe into watch glass.

Draw mixture into Westergren pipette to the mark "O," and place pipette in a Westergren rack in a *vertical* position.

The number of millimeters that the erythrocytes drop in the pipette is the sedimentation rate.

Read the sedimentation of the erythrocytes in mm. from the pipette at the end of one hour.

Normal: after one hour, 1 to 3 mm. for men; 3 to 7 mm. for women.

Abnormal: after one hour, 10 mm. or more.

CUTLER METHOD

Materials:

Tubes, 5 cc. capacity, graduated in 0.1 cc., each 0.1 cc. 1 mm. in height.

Sterile 5 cc. syringe.

Freshly prepared 3 per cent sodium citrate solution, sterile.

Other equipment as above.

Cutler sedimentation charts.

Technique:

Draw into syringe 0.5 cc. sodium citrate solution.

Draw blood to 5 cc. mark.

Mix as above.

Pour contents into Cutler sedimentation tube.

Stopper with a paraffin-coated cork.

Take readings every five minutes for one hour.

Draw curve on sedimentation chart.

Total red cell sedimentation in millimeters, at end of one hour is called the "sedimentation index."

Normal: after one hour, 2 to 8 mm., average 3 to 4 for men; 2 to 10 mm., average 5 to 6 for women. In menstruation it may be as high as 12 mm.

Abnormal: after one hour, 10 mm. or more.

(Procedure slightly modified if 1 ml. Cutler tube is used.)

(Consult standard text for classification of graphs.)

Clinical Application.—First of all, it must be stated definitely that the sedimentation of the blood is nonspecific as a diagnostic test. It is comparable to leucocytosis, anorexia, fever, tachycardia, loss of weight or fatigue. Fahraeus[1] stated that a diminished stability of the blood is "one of the most common general reactions of the organism to disease, perhaps the most common." We have been slow in recognizing the importance of blood sedimentation findings as an essential part of the clinical picture. Clinicians have been perfectly willing to evaluate the significance of fever, leucocytosis, or urine analysis, but have been

reluctant to use sedimentation readings which add a great deal to the general information in regard to a patient's condition. Of all laboratory tests, blood sedimentation is one for the general practitioner; the equipment and materials are minimal and not expensive and the technique is easy.

In discussing the various conditions in which blood sedimentation findings are of diagnostic value, it is necessary to rule out normal physiological variations.

(1) There is a slight difference between the two sexes, 1 to 3 mm. an hour for men and 3 to 7 mm. an hour for women (Westergren). The type of procedure used will also alter these figures slightly. Many authorities are willing to abandon the double standard and consider a reading below 10 mm. an hour as normal for either sex.

(2) There is a slight tendency for the rate to be a few points higher in old age, due to senile structural and functional changes, but this is thought to be of minor significance if other findings are negative. (Miller[9].)

(3) During pregnancy the sedimentation rate increases between the tenth and twelfth weeks and does not return to normal until 3 to 4 weeks post partum. At term the reading is usually five times the normal level or about 35 mm. an hour.

(4) During menstruation there may be a slight fluctuation.

(5) The literature abounds with discussions in regard to correcting the final reading for the erythrocyte concentration as in anemia, fibrinogen percentage, globulin percentage, type of apparatus, etc. After all is said and done, it is agreed that these correction factors are not necessary and do not enhance the accuracy of the test except in special instances.

(6) All authorities from Fahraeus to the present time agree that the mechanism of blood sedimentation is obscure but that the phenomenon of increased sedimentation rate depends upon the degree of cellular destruction going on in the body, and is not specific for any given disease.

Pathological Variations.—There is a wide range of pathological conditions in which the sedimentation test is a very definite diagnostic, prognostic and therapeutic guide. Research and correlation of findings are still progressing rapidly in regard to sedimentation readings; therefore, this review represents only the present status of the problem.

(1) In active pulmonary tuberculosis the sedimentation rate may be as high as 65 mm. an hour. For a time it was thought that if the sedimentation rate was normal, tuberculosis could not be present; and that if there was an elevated sedimentation rate, it would be plausible to diagnose the disease even when the sputum did not reveal tuberculosis germs, provided other cardinal symptoms were present. This overenthusiasm for the test may be tempered by saying that it is many times a better guide than the temperature, leucocyte counts, pulse, weight changes and other symptoms. The test is of great prognostic value since the increase or decrease of the rate follows the degeneration or healing of lesions. There is a difference of opinion in regard to the efficacy of the test in determining the progress of pneumothorax therapy. Some clinicians state that in many cases the sedimentation rate will increase before new regions of involvement can be detected by x-ray. Thus the test is a very useful procedure in following the course of tuberculosis. Sedimentation findings are of limited value in extra-pulmonary tuberculosis.

(2) The sedimentation rate is increased in syphilis, depending upon the state of tissue destruction.

(3) It is markedly increased in pneumonia and septicemia.

(4) It is increased in lead and arsenic poisoning.

(5) It is increased in thyrotoxicosis.

(6) In arthritis, the sedimentation rate is increased definitely in the acute forms and moderately so in chronic forms. In spite of the differences of opinion which exist, it is safe to conclude that the chief value of the test is in detecting infectious arthritis. In order to differentiate the various types of arthritis, additional diagnostic procedures are necessary.

(7) In rheumatic fever there is always a high sedimentation rate, which appears following the leucocytosis but is last to return to normal. An active carditis is rare if the sedimentation rate has returned to normal; the test may be used as a reliable criterion for determining the proper time for discharge of the patient. In this regard the sedimentation rate is a more accurate guide than other clinical manifestations.

(8) In pediatrics, sedimentation is increased in acute polyarthritis. The rate is increased also when chorea is associated with polyarthritis, endocarditis or pericarditis. During the period of activity of tuberculosis of the bronchial lymph nodes in children, it may reach 50 mm. an hour (Westergren).

(9) In gynecology the sedimentation test is of decided value in the differential diagnosis of conditions causing pain in the right lower quadrant, particularly within the first 48 hours of the onset of symptoms. Several investigators have shown that the sedimentation rate remains practically normal in acute appendicitis for the first 48 hours from the onset of symptoms. Increased rates are observed only in localized abscesses or general peritonitis.

In acute salpingitis, before the swollen fallopian tube can be palpated, there being only tenderness and muscular spasm, the sedimentation rate will be increased markedly, often to as high as 50 to 100 mm. an hour. Thus, acute appendicitis and the early stage of acute salpingitis may be differentiated in part by the sedimentation rate. There is additional differential value in the test with acute salpingitis giving a sedimentation rate of 50 to 100 mm. in 30 to 50 minutes, while an unruptured ectopic pregnancy with very little or no blood in the peritoneal cavity will have a rate of 20 to 35 mm. in 100 to 120 minutes. A twisted ovarian cyst may cause a high sedimentation rate, if tissue circulation has been impaired. The test may be used also to follow the course of postabortal infections and the recovery from salpingitis, often indicating the proper time for operation, or the time when the patient may be allowed to get out of bed. Relapse is rare if the patient remains in bed until the sedimentation rate falls below 30 mm. an hour.

(10) In low-grade chronic illness, an increased sedimentation rate may be expected in about 80 per cent of the cases.[10]

(11) In psychoneurotic cases with unusual symp-

toms, without discernible organic disease, repeated sedimentation tests will be normal, thus excluding organic disease.

(12) There is a difference of opinion in regard to the sedimentation rate in allergic diseases. Confirmation should not rest upon this test.

(13) The test is of great value in differentiating angina pectoris from coronary thrombosis. If coronary thrombosis has occurred, there will be an increased sedimentation rate within 4 to 6 days following the attack, to as much as 40 to 60 mm. an hour depending upon the degree of tissue damage. If there has been no tissue damage as in angina pectoris, the sedimentation rate will remain normal. Following coronary thrombosis, the test not only is of prognostic value, but also is a reliable index as to when the patient may be permitted more strenuous activity. The patient should be kept at rest until the sedimentation rate has returned to normal, or fails to return farther toward the normal. Of course all other infections, or tissue destruction elsewhere in the body, must be ruled out of the picture. This is true in all cases where the sedimentation test is depended upon. Again may it be repeated that the sedimentation test is not specific for any given disease, but depends upon the sum-total of infection or tissue destruction in the body.

(14) The sedimentation rate does not follow the fever curve except at the close of a severe infectious process. It may be stated that the sedimentation reaction parallels the process of resorption, while the leucocyte reaction follows the degree of toxic reaction of the patient.

(15) There has been some application of the sedimentation test to the diagnosis of neoplasms. In the main, benign tumors do not affect the sedimentation rate unless there is tissue destruction. Malignant tumors, on the other hand, give high sedimentation rates depending upon the degree of tissue damage. Radiation of any tumor will increase the sedimentation rate whether benign or malignant. Additional information is continually available on this subject and should be watched in the current literature.[11]

(16) In cases of focal infection the sedimentation rate is constantly elevated. The test is of extreme value particularly when the location is obscure. If the sedimentation rate is increased, further search should be made for the infection. This is particularly true in the cases of questionable teeth, tonsils, appendix, etc.

(17) In whooping cough, the presence of cough, leucocytosis with relative lymphocytosis and a normal or subnormal sedimentation rate is diagnostic.[12]

(18) In diabetes mellitus the sedimentation rate is often markedly elevated, but it is currently interpreted to be the result of associated tissue destruction and not the hyperglycemia.

(19) The sedimentation rate is increased in pyelitis and nephritis, particularly in children, serving as a reliable guide in prognosis and recovery.

CONCLUSIONS

It has been the purpose of this paper to present the history, physiology, general principles of technique, and clinical application of the blood sedimentation test. The test has passed through an adequate experimental stage accompanied by the accumulation of a wide and accurate aggregation of clinical data over the past 20 years, particularly during the last decade. The blood sedimentation test may now take its place along with other standard laboratory tests which are performed routinely by the general practitioner as well as by the specialist. Increased erythrocyte sedimentation cannot be interpreted as revealing a given disease any more specifically than a blood cell count, but it is an index of the extent and speed of tissue destruction in the body, and when interpreted in the light of other clinical findings is of unquestionable value. No attempt has been made to cover every conceivable application of the test in this paper.

720-722 Sixth Ave.

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PUBLIC HEALTH RADIO PROGRAMS

Educational health programs approved by the Committee on Public and Professional Welfare of the American Osteopathic Association are being broadcast over the following stations:

KFKA—880 kilocycles, Greeley, Colo., Wednesday, 5:30 p.m., Colorado Osteopathic Association.

WMFJ—1420 kilocycles, Daytona Beach, Fla., Saturdays, 10:30 a.m., Volusia County Osteopathic Association.

WCLS—1310 kilocycles, Joliet, Ill., first and third Thursdays of each month, 3:45 p.m., Illinois Osteopathic Association.

WFAM—1200 kilocycles, South Bend, Ind., third Friday of each month, 11:45 a.m., St. Joseph Valley Osteopathic Association.

KSO—1430 kilocycles, Des Moines, Ia., Wednesdays, 2:45 p.m., Iowa Society of Osteopathic Physicians and Surgeons.

KIUL—1210 kilocycles, Garden City, Kans., Wednesdays, 11:30 a.m., Southwest Kansas Society of Osteopathic Physicians and Surgeons.

KGKY—1500 kilocycles, Scottsbluff, Neb., every other Thursday, 2:00 p.m., Nebraska Osteopathic Association.

WJTN—1210 kilocycles, Jamestown, N. Y., Wednesdays, 3:45 p.m., New York State Osteopathic Society.

WHBC—1200 kilocycles, Canton, Ohio, Wednesdays, 3:15 p.m., Stark County Osteopathic Society.

KFDA—1500 kilocycles, Amarillo, Texas, Thursdays, 9:00 p.m., Amarillo Society of Osteopathic Physicians and Surgeons.

WDZ—1020 kilocycles, Tuscola, Illinois, second and fourth Wednesdays of each month, 1:30 p.m., Illinois Osteopathic Association.

WAAF—920 kilocycles, Chicago, Saturdays, 1:30 p.m., Chicago Osteopathic Association.

KVFD—Fort Dodge, Iowa, Wednesdays, 4:00 p.m., Iowa Society of Osteopathic Physicians and Surgeons.

Leadership—The Penalty of a Minority*

W. V. GOODFELLOW, D.O.

Los Angeles

It was William Shakespeare who, more than four hundred years ago, wrote: "See first that the design is just: that ascertained, pursue it resolutely; do not for one repulse forego the purpose that you resolve to effect." This is a good motto —one which we as a profession might well adopt as a slogan.

"See first that the design is just . . . " For the past three years your Endowment Committee, all of the colleges, and some hospitals have been busy making the design of future osteopathic institutions. Designs of new, enlarged and adequate buildings have been created against the time when endowment money will provide them for us. Needs have been studied, including equipment, endowment of chairs, scholarships, research laboratories, paid faculties and many others. Also, the design of the business and legal structure of our institutions is being changed to conform to that required of endowed institutions. The importance of this is realized only when it is understood that those who give money demand as an assurance of security and proper handling of funds that a certain pattern be followed. In many instances, this pattern provides for management in perpetuity. Endowment departments are being set up in the colleges for the management of continuous endowment activities. Thus it will be seen that the design is being completed to make our colleges eligible for endowment money.

The design of our philosophy and our therapy is just. As a school, we believe in the supremacy of natural law. Our therapy is founded on natural law. We believe that but few drugs are curative; that the drug trust with its pernicious methods of using unsuspecting physicians of all schools as unpaid salesmen should be curbed; that $700,000,000 is too much for this country to pay for medicines in any one year; that it is Nature that cures; that the best doctor knows the most about natural law and studies Nature more than drugs, and that an essential part of any doctor's armamentarium is the ability properly to adjust maladjusted structures.

The design of our legal recognition needs changing. We believe that unlimited privileges in practice are the right of every true physician in a free country. We must guarantee this to every graduate of our colleges or fail in our duty to them. This will be difficult of accomplishment unless we maintain such high educational standards, both preosteopathic and undergraduate, that we cannot be denied by legislatures. This part of our design is vital. Student recruiting will continue to be more and more difficult unless and until our institutions appeal from a strictly educational standpoint to educated young men and women. To improve undergraduate teaching is a main objective in seeking endowment.

We believe that it does not necessarily follow, because a school of medicine is large and dominant, that its plan is a just plan or that its theories are correct theories. There is a place for a minority school dedicated to the purpose of restoring sanity to the practice of medicine by reestablishing in the minds of men the fundamental laws of Nature governing health and disease. This, after all, was the chief burden of Dr. Still's writings. This, we believe, will be accepted by the public as a design that is just.

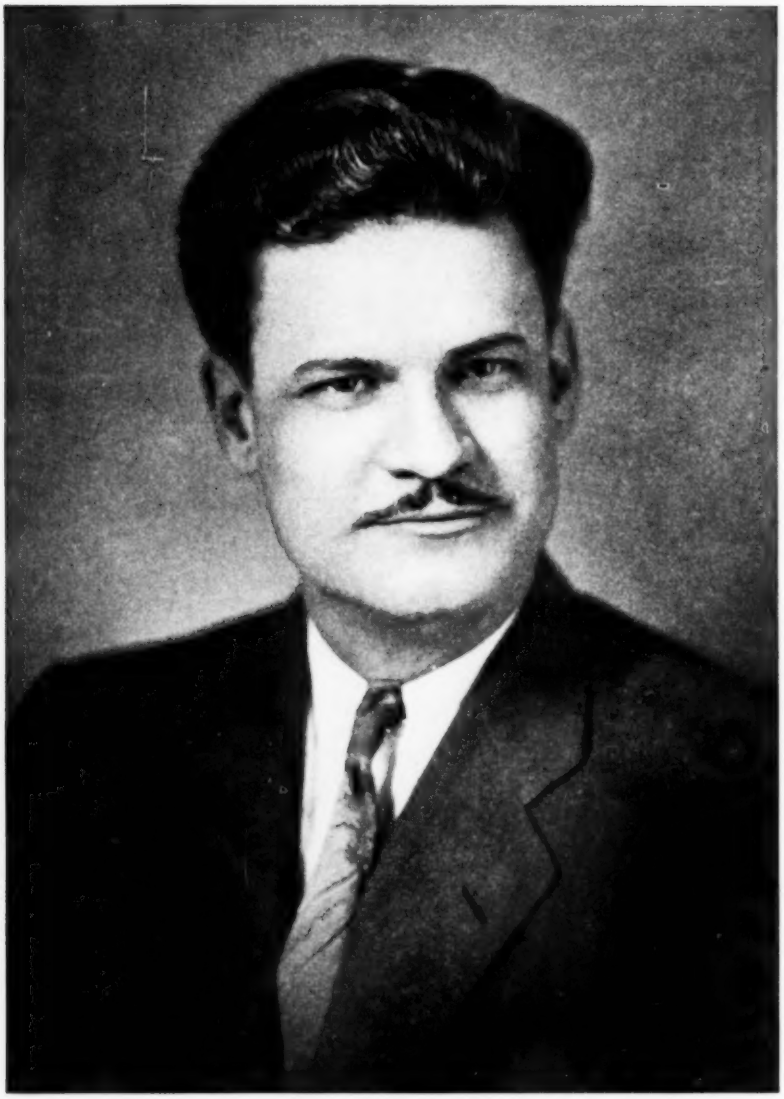
As a minority school of medicine, we have made a favorable impression upon the minds of the public. New technics in public relations work in keeping with modern trends are being developed by the Division on Public and Professional Welfare. Resistance of reactionaries in some divisional societies and in some of our institutions is slowing our progress. All, however, should be able to agree on the wisdom of securing endowment, and of acquainting our public with the opportunity afforded them to assist our program.

Our design to this end is just. It contemplates a literary barrage carrying the story of the philosophy of our school of therapy, and a public relations campaign which is broad enough to stimulate general interest in osteopathy before stimulating local interest in any one osteopathic institution. It will tend to correct wrong impressions in the public mind concerning osteopathy. It will paint such a picture of osteopathy as to create enthusiasm for it. It will, we believe, crystallize the interest of those who have money to give.

We have, then, first, a design that is just. This we have ascertained, and now we are to pursue it resolutely and are not for one repulse to forego the purpose that we resolve to effect. The end to be attained justifies a resolution by every one of us to see that our just design is accomplished. With endowment money, gifts and bequests to erect buildings, provide equipment, establish research laboratories, provide scholarships and pay faculties, our institutions will be relieved of some of the pressing necessity for capturing students to maintain exchequers. The plea that numbers are needed will best be answered by the development of such institutions as will appeal to numbers. Osteopathic physicians are called upon to handle cases and meet problems similar to those handled by physicians of the older school. They should not, therefore, be in any way less equipped. Our knowledge of disease must not in any whit be less complete than theirs. What this implies in the matter

(Continued on page 562)

*Delivered before the General Sessions at the Forty-Fourth Annual Convention of the American Osteopathic Association, St. Louis, June 24, 1940.



DR. F. A. GORDON
Marshalltown, Iowa
President, 1940-1941

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THE ST. LOUIS CONVENTION

Since the story of the forty-fourth annual convention of the American Osteopathic Association, held June 23 to 28 in St. Louis, was published in THE FORUM OF OSTEOPATHY for August, already in the hands of the profession, space will not be taken here for a full report. The minutes of the meetings of the Board of Trustees and the House of Delegates are in the process of being transcribed and will be published, after they have been edited, in the September JOURNAL together with the annual reports of the chairmen of the various Departments, Bureaus and Committees of the A.O.A.

Some of the important actions taken by the official bodies of the A.O.A., which were mentioned in THE FORUM, bear repeating here at this time. Perhaps the most significant step was the passage of a resolution by the House of Delegates offering the services of osteopathic physicians and surgeons and their institutions to the United States Government to "serve this country in peace and in war, according to their professional capacity, training, and equipment." In answer to President Roosevelt's call for an appraisal of the nation's defense resources and the development of a program for their most efficient use in the event of war, the American Osteopathic Association has undertaken a survey of osteopathic services, institutions and equipment. Questionnaires have been sent out *which should have the careful attention of every practicing osteopathic physician and surgeon.* They should be answered fully and correctly and returned to the Central office with all possible speed. With this information the A.O.A. will be ready to provide to the Federal government a most up-to-date survey covering the full extent of osteopathic services and institutions available for any program that may be inaugurated, for public health or for defense.

An amendment to the Constitution passed at this convention provides for the inclusion of the First Vice President on the Executive Committee with both voice and vote. The membership of the Public Relations Committee was increased from three to five as a result of a motion passed to retain the services of each retiring President on the Public Relations Committee for a term of two years. Dr. Arthur E. Allen, Minneapolis, was recalled for one year, and Dr. Frank F. Jones, Macon, Ga., will serve the full two years. The Public Relations Committee under this new setup now consists of Dr. Chester D. Swope, Washington, D. C., Chairman; the new President, Dr. F. A. Gordon, the immediate Past President, Dr. Frank F. Jones; Past President Dr. Arthur E. Allen, Minneapolis, and Executive Secretary Dr. R. C. McCaughan, Chicago.

DR. PHIL R. RUSSELL
Fort Worth, Texas
President-Elect

Another important action taken by the Board and House was the reorganization of the Departments, Bureaus and Committees of the A.O.A. This was done for the purpose of simplifying and coordinating various public and professional activities, and remedying such duplications and gaps as are inevitable accompaniments of growth such as ours has been. The new official roster is published on pages 563 and 564.

DR. J. PAUL PRICE
Oklahoma City, Okla.
First Vice President

Dr. F. A. Gordon, Marshalltown, Iowa, was duly installed as President. The new President-Elect is Dr. Phil R. Russell, Fort Worth, Texas. Dr. J. Paul Price, Oklahoma City, Okla., was elected First Vice President; Dr. Hubert J. Pocock, Toronto, Ont., Second Vice President; and Dr. Eva W. Magoon, Providence, R. I., Third Vice President. The trustees elected for three years are: Drs. R. McFarlane Tilley, Brooklyn, N. Y., reelected; Walter E. Bailey, St. Louis, reelected; C. Robert Starks, Denver; C. Haddon Soden, Philadelphia; and Louis H. Logan, Dallas, Texas.

DR. HUBERT J. POCOCK
Toronto, Ont.
Second Vice President

In accordance with the power vested in the House of Delegates, cities were chosen for both the 1941 and 1942 conventions. Atlantic City won the 1941 convention, the dates being June 22 to 27 inclusive. Los Angeles was chosen for the 1942 convention, and the dates were set at July 12 to 17 inclusive.

DR. E. W. MAGOON
Providence, R. I.
Third Vice President

The program chairman for the 1941 convention, chosen last year by the then President-Elect, is Dr. Walter W. Hopps, Jr., Los Angeles. The program chairman for 1942, chosen by the new President-Elect, is Dr. Otterbein Dressler, Philadelphia.

R. E. D.

TRUSTEES ELECTED FOR THREE YEARS

DR. R. MCFARLANE TILLEY
Brooklyn, N. Y.
reelected

DR. WALTER E. BAILEY
St. Louis
reelected

DR. C. ROBERT STARKS
Denver

DR. C. HADDON SODEN
Philadelphia

DR. LOUIS H. LOGAN
Dallas, Texas

YOUR CHANCE TO SERVE—FILE THE FACTS

Your opportunity is here to serve, with one act, yourself, your profession, the public health, society, your country, civilization. It takes but a few minutes to provide the information asked for in the questionnaire you have received from the A.O.A. Committee on Public Relations, and *you must not fail.*

Those who thought that "it can't happen here" have found that it has happened, is happening and will happen. Osteopathy has its part to play in today's fast-changing picture, and you individually have your part.

A resolution adopted at the St. Louis convention emphasizes the importance of the profession's "contributing and cooperating to the utmost of its facilities for the advancement and preservation of the health and safety of the American people." Too long we have neglected our duty in that connection, having neglected it we have complained that our profession is not recognized. Today you can do your part toward putting the benefits of osteopathy at the service of those who need them most.

Twenty-two years ago the Army opined that osteopathic physicians were not good enough to contribute to the public welfare where they were best suited to serve. It was not the soldiers who made the decision, nor the people, nor the Congress. The handicap was set up by a regulation which still stands. It must be changed.

In the best-known bill introduced in Congress at the time of writing for selective training and service there was a provision that "the President shall . . . defer training and service . . . of those whose employment . . . in . . . medicine . . . [is] found to be necessary to the maintenance of the national health, safety, or interest . . . The determination of each deferment . . . shall be made with regard to the status of the individual . . . "

This would mean that two things are necessary. Your filling out the questionnaire will help fulfill both of these—the recognition of osteopathy as being included in such deferment, and your own status as an individual.

Let us not be misunderstood. It is not certain that any selective training measure will be adopted. If one is, it is not certain what, if any, exemptions there may be. Filling out, or failing to fill out, a questionnaire does not mean that you will or will not be drafted.

The distribution of the questionnaire is not to imply that there is any assurance whatever of the inclusion of osteopathic physicians as such in the armed forces.

In fact, it must be clear that this questionnaire is not simply a war measure. For years your national organization has fought, and has urged divisional and local organizations to seek, to give osteopathy its proper place in the public health picture. Present conditions make it necessary that we demonstrate our fitness for, and claim our right to a place in, a wide variety of health activities. The President has gone so far as to recommend that all youths give one year to public service—being trained during that time in some skill. Whether or not that is done it is a symptom of the growing feeling that each of us owes a first duty to the public good. Whether it is given voluntarily or whether it is required, it is incumbent upon us to be organized and self-informed as to what we can best do individually and collectively. Thus it is just as important to know your serviceability at home, as anywhere else.

This number of THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION (p. 565) contains a strong call from the Surgeon General of the United States Public Health Service saying, "As doctors and nurses we have been servants of peace . . . This country as yet seems unprepared for the total effort toward strength which recent world events make imperative . . . No nation has arisen to strength . . . or remained strong . . . without dynamic aggressive action." He discussed "the aggressive action which you and I, by virtue of our calling—because we are the servants of peace—must take to build up national strength . . . He discussed the National Advisory Committee of the Defense Council, made up of seven fine persons not one of whom recognized the present importance "of the application of medical and public health science

to the physical problems of a nation . . . None of the official agencies has the full aid and service which the public-spirited foundations set up to promote health and welfare are able to give . . . A first task is the need for listing and classifying professional and technical personnel in the country; for planning and aiding, if and when necessary, the recruitment and mobilization of medical and health personnel."

It should be obvious that in the event of emergency those who have taken steps to register the facts as to their preparation and fitness are more likely to be placed where their capabilities will count for most, while others are likely to be assigned tasks in which they will not be able to render the quality of aid of which they are capable.

Thousands of questionnaires already are in. If yours is on your desk, take it up now. Take time, give the correct answers. Do not take the attitude that the information already is on file at Central office. Some facts are here, but in no case is all the required information on file. It would be a tremendous job for our workers to dig them out. For you to answer for yourself is a simple task. These blanks are prepared uniformly, for quick, efficient, mechanical computation.

In the name of civilization, of your nation, of your society, of your professional organizations, your profession and yourself, you are urged to fill out the questionnaire and return it now.

THE MEMORY OF ANDREW TAYLOR STILL

August is the birth month of a great man whose memory is being besmirched in state after state by the character assassins in political allopathy who are determined, at whatever cost of the public welfare and of true scientific medicine, to befoul his name. Into the public libraries and into the court records they are putting warped and twisted stories in which they have taken his words and acts out of their proper setting, and in which they compare his formal schooling (or the lack of it) and his written words with those of people living three-quarters of a century later and in a very different civilization.

We may do well to quote a few words published in these pages one year ago—extracts* from Michael A. Lane's "A. T. Still, Scientist and Reformer":

"Like all great original thinkers, Dr. Still had theories for almost every disease and function of the body, and many of these theories were crude and incompetent, just because the then state of the sciences he dealt with was still crude and incompetent. . . .

"If Dr. Still had been right in all his theories he would not have been human, not worthy of human admiration. . . . Dr. Still's very errors would have been accounted discoveries if made by a common man. . . . He had thought out a scientific theory to account for the phenomena of cholera, for example, when other men accounted for them by the belief that this disease was a visitation of Providence on the sins of men. . . . To originate any kind of a scientific theory at all of this disease in that day was the mark of an original, scientific and profound thinker. . . ."

There are those today who try to make capital of the fact that a certain physician on the plains of Kansas in the '60's was not a medical graduate. They forget (?) that "in 1867 there were sixty-four surgeons and assistant surgeons attached to the eleven great London hospitals and medical schools. Only seven of them had medical degrees. . . ."[1] They pass by his words of wisdom and quote his errors, forgetting(?) that "one of the most thoughtful, most eloquent, and best-known London surgeons of the day, on the staff of St. Bartholomew's Hospital . . . the most influential London school,"[2] addressed the British Medical Association in 1879, in bitter opposition to the antiseptic methods of Lord Lister in connection with surgery. They ignore the fact that whole libraries not only could be, but have been, written recounting equally unfavorable pictures of the medical world of that day.

Whose is the fault that the memory of a great man can be degraded thus? It is ours. If once a month, or even once a year, each of us would inform and remind himself of the true facts concerning Dr. Still, it would put us in a frame of mind to stop these attacks upon a man who is no longer here to speak for himself. Bunting[3] said:

"Andrew Taylor Still was a lineal descendant of the mind from the ancient philosophers of Greece. In important respects he seemed an anachronism in contrast with the typical scientific mind of his closing decades. . . .

"He began to think upon each problem that came before him with all the spontaneity and joy and unprejudiced freedom of those giant minds of ancient Greece—minds that had not been set by crystallization of traditional thinking. Still was a primitive—a rugged heart and conquering mind of the sort that unfolded only at long intervals and in scattered places throughout the childhood of the race and began to seek knowledge as if nothing before worth while had ever been discovered. The very unacademic atmosphere of his intellectual vigor, the range of his vision and the poetry of his conceptions irresistibly stamped him as of that time when the morning stars sang together and all the sons of God shouted for joy. . . .

"Doctor Still was a philosopher of the deductive sort—his mind rose almost at the first statement of a problem to some formulation of its general principles; his interest in facts was but momentary—they might prove stepping stones to quick conclusions; but his thinking tarried only long enough upon instances, upon the data of sense, to afford him a sudden spring toward their interpretation with some sort of general theory; his ceaseless concern was to apprehend natural laws—which is to say, give the rea-

*Jour. Am. Osteo. Assn., 1939 (Aug.) 38:585.

1. Godlee, Rickman John: "Lord Lister," Third Edition, Revised, London, Oxford, 1924, page 333.
2. Godlee: *Ibid.*, p. 322.
3. "The Real A. T. Still"; editorial by Dr. Harry S. Bunting in *The Osteopathic Physician*, December, 1917.

sons for things, interpret facts, make theories which explain how nature operates. . . .

"Once on the scent of a theory Dr. Still could be very impatient of his facts. If a fact bobbed up out of tune with his theory, so much the worse for the fact at that moment; he would ignore the fact, deny it, hurdle over it and hasten on to his mind's work of completing the previous theory. Afterwards there would be time to take the dents out of incidents that would not jibe with a fond and promising theory! . . .

"Unfortunately, Doctor Still was followed by many who accepted the very eccentricities of his genius as the letter of the law of science, as the last revelation that would be made to man about healing. These well-meaning but emotional [osteopathic physicians] conceive the science and art which Doctor Still founded as static, as furnished complete through his revelation, and anathema be to him who differs in opinion from any least fiat that the master uttered, even when his speech was in the form of metaphor, hyperbole, apocalypse! . . . We who revere the master's words for the truth they contain but not error when he happened to utter it, now have a work to do to give our more literal-minded brethren revised scientific and rational bearings."

If words like those of Lane and of Bunting were kept in our own minds, and placed before the eyes of leaders of lay thought, there would be no opportunity for an unscrupulous foe to becloud the issue and malign the memory of Andrew Taylor Still.

LEADERSHIP—THE PENALTY OF A MINORITY

W. V. GOODFELLOW, D.O.

(Continued from page 557)

of equipment and budgets can be realized best by reading the following article typical of numerous others which appeared in public print recently.

MILLIONS SPENT TO IMPROVE NATION'S MEDICAL SCHOOLS

In the past five years, millions of dollars have been spent to improve organization, equipment and resources of medical schools. Among the 67 approved medical schools, 24 of the lower ranking schools have added more than a million dollars to their annual budgets, an average of $47,000 each. In 20 schools the cost of improved facilities for clinical teaching has aggregated $10,000,000.

What are we doing to increase budgets and improve facilities for clinical teaching?

Not the least of our needs is research. We need research to establish the facts underlying the clinical results which all of us have seen. But more important, we need research for the influence it will have upon our instructors and their instruction. This point is well stated by C. M. Gruber of Jefferson Medical College:

The medical school is improved by the fact that research is in progress within its walls. The standard of teaching is elevated. The highest type of man is encouraged to join the faculty of a school in which he knows his efforts will be encouraged. The better the type of teaching the school employs the higher the type of student who is attracted. . . . Failure to support research will quickly reduce the reputation of the institution everywhere.

And I quote from a bulletin from Antioch College:

It is one of the accepted duties of higher education to generate knowledge as well as to impart it—a duty which the great universities, especially, have taken to heart. In the face of the enormous facilities available for research in these large centers, how much should the small colleges undertake?

While colleges obviously cannot compete in scope of research program with the large universities, they are not thereby exempt from the obligation to advance knowledge in so far as they can. Research, it is argued, is valuable both in itself and as a stimulus to teaching and learning. As stimulation, if for no other reason, the small college can hardly afford to ignore research.

The amount of useful knowledge flowing out of research institutions today makes it imperative that we have full-time, paid faculties who have time to devote to the study and analysis of this material. This cannot be done adequately by volunteer teachers who earn their living in private practice outside of teaching hours.

Physiology of today is not the physiology of yesterday. Animal experimentation, blood research and countless sources of new information provide volumes of material on this one subject alone. Chemistry is not the chemistry of yesterday. The microscope and ultra-microscope are expanding our knowledge of germ life so rapidly that few can encompass it. Our knowledge of disease, methods of diagnosis, laboratory technics and technics of treatment have changed with our changing knowledge of basic scientific facts. This has increased the volume of medical literature the teacher and physician of today must peruse as compared with the teacher and physician of yesterday.

One of our lay friends has said that to him "osteopathy is the new and modern school of therapy." Let us accept this as a challenge and meet it by being worthy of such an opinion. If we do, we must encompass this new knowledge. We can do this by expanding our horizons and keeping pace with present-day trends. All of this need not lead us away from our fundamental principles. In fact, it may and should lead us back to them. Our motto should continue to be "Osteopathy stands for the truth wherever it is scientifically proved."

In conclusion, then, we have the conviction of a right fundamental concept underlying our system of practice. We have public approval. We have been able to maintain ourselves against the opposition of a formidable competitor. We have done this in spite of the fact that our colleges have been operating on tuitions largely. We have a logical, just design for the enlargement and improvement of our institutions. We have wealthy friends who, knowing the opportunities offered for an investment in human life, will, we believe, give liberally to our institutions. With their help in financing and our knowledge of design in theories and therapy, osteopathy can obtain its objectives. It is our opportunity and our duty. We have seen that our design is just. That ascertained, we propose to pursue it resolutely, and we will not, I trust, for one or many repulses forego the purpose that we resolve to effect.

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Special Article

Health and Medical Preparedness*

THOMAS PARRAN, Surgeon General
U. S. Public Health Service
Washington, D. C.

The problem which concerns each of us today is what we can do to contribute to the safety of our country. Traditionally, as doctors and nurses, we have been servants of peace. When war did come, it was our job to patch up the wounds, ease the suffering of the wounded, and repair as best we could the damage done by shot and shell.

We are not at war. If we have time enough—if we are swift and wise enough in the time that we have—war in this hemisphere may be prevented. But the old rules of war, and the preparation for it, have been demolished. The whole task of national defense is different than it was 25 years ago. Just as the perversion of the physical and chemical sciences has brought more brutal, more rapid, more devastating destruction both to unprepared armies and unarmed civilians, the developments of the medical sciences have expanded the scope of what doctors and public health workers can do for preparedness. The concept of a total war necessitates the concept of a total defense—a total national effort, not only toward resistance but toward unassailable strength.

Psychologically, this country as yet seems unprepared for the total effort toward strength which recent world events make imperative. On the one hand we hear imprecations because we are not now better prepared in guns and ships and planes and organized manpower. On the other hand, we hear criticism at steps taken now to prepare promptly against aggression toward ourselves, or our immediate neighbors. One of the risks I see to national unity of action lies in the idea that defensiveness, alone, is all we need to preserve our democracy. Yet as Governor Lehman has said again and again, democracy is a thing we must constantly fight for. All recorded history shows, I think you will agree, that no nation has arisen to strength, as we have; or remained strong, as we hope to—no human rights have been established or liberties maintained—without dynamic, aggressive action. St. Paul and the apostles were not defensive when they established the Christian faith. Our Revolutionary ancestors were not defensive when they fought to establish human liberties and found a nation. The Boston Tea Party, for example, was one of the most provocative acts on record. Buchanan was merely defensive when he permitted the Nation to fall into the turbulence and dissension which preceded the Civil War. Lincoln took the dynamic aggressive to preserve the Union, without which we now should be as helpless as little Denmark.

Today I would discuss with you the aggressive action which you and I, by virtue of our calling—because we are the servants of peace—must take to build up national strength. The needs to be met are enormous in scope, yet simple in analysis. National strength can be built up only by the adequate application of all the sciences to the provision of armament, munitions and supplies, food, and manpower. Our job is manpower.

Seven competent, trustworthy persons recently were called to assist the Government in national defense. Industry is represented, both in raw materials and processing. Labor, agriculture, transportation, the consumer, are represented. There is a shrewd eye on the stabilization of prices. Research problems in the physical and chemical sciences are being attacked with vigor by an able committee, which will apply all the knowledge we have or can discover to the perfection of armaments. Yet, so far as I know, there has been no more thought than in 1917 of the application of medical and public health science to the physical problems of a nation arming.

Yet for what cause is this Nation arming if not on behalf of the men, women, and children who compose it? Their physical fitness, their freedom from preventable disease, their morale or mental stamina, will determine almost entirely the effectiveness of all other defense efforts. Important in the easy days of peace without a cloud on the horizon, it is urgent now that the people of this Nation be physically tough, mentally sound, and morally strong. If we are not, to quote Mr. MacLeish, "we can leave our planes unbuilt and our battleships on paper. We shall not need them."

In time of stress, the health problems of the military and civilian population are inseparable. At present they are the responsibility of many unrelated Federal agencies having the happiest personal good will toward one another, but with no more official authority or compulsion toward coordinated action then did an airplane factory and an automobile plant two months ago. Each of these agencies legally can perform only certain functions set up by law. None of them has a close, working integration with the organized medical and public health professions. The State health departments are as diverse as the forty-eight States. None of the official agencies have the benefits of a full working relationship with the great voluntary associations for health and welfare, in which doctors, dentists, nurses, engineers, in their technical capacity, work side by side with citizens to caulk up the leaks in the hull of our national manpower. None of the official agencies has the full aid and service which the public-spirited foundations set up to promote health and welfare are able to give.

Our defense plans, for the immediate emergency, are still young. There is much in the way of organization and coordination yet to come. But as a first step in meeting the vital needs of manpower preparedness, I propose that a coordinator of medical and health preparedness for national defense be appointed under the National Defense Council. There is much for him to do. He would work with and through the Surgeons General of the U. S. Army, the U. S. Navy, and the U. S. Public Health Service, other Federal agencies, and the national voluntary organizations concerned with the prevention, diagnosis, and treatment of disease.

A first task is the need for listing and classifying professional and technical personnel in the country; for planning and aiding, if and when necessary, the recruitment and mobilization of medical and health personnel.

Another urgent task involves the protection and promotion of the health of industrial workers. With the vast expansion of the war industries, many new industrial hazards appear and familiar ones are intensified. When new factories are designed, expert industrial-hygiene advice is required for proper installation of power exhausts of chemical gases. Records of present performance show the need of extended industrial-hygiene measures to control and prevent special health hazards. In the recruitment and training of workers, thorough physical examinations are necessary upon employment and periodically thereafter. It is wasteful for industry to train a highly skilled employee over long months, only to have him break down suddenly with tuberculosis, mental disease, or some other crippling condition.

*Read before New York State Conference of Health Officers and Public Health Nurses, Saratoga Springs, June 25, 1940. (Submitted for publication by the Public Relations Committee of the American Osteopathic Association.)

The expansion of war industries will bring acute problems of housing, medical care, and health protection for workers and their families. Our industrial machines are the most efficient in the world. The men and women who man the machines must have a comparable efficiency.

Certain diseases have particular military importance. The venereal diseases are at the top of the list. They caused more disability in the last war than anything except wounds and influenza. Fortunately we have been forehanded in building some machinery in every State to deal with this problem. We need to intensify these efforts, especially in those areas of military and industrial mobilization.

The importance of tuberculosis is accentuated by the current situation. Here, too, we have made some progress since the last war in terms of a lower active infection rate and a lower death rate, but we do not have in any State the machinery to detect all active cases of the disease. In very few States do we have the sanatoria to care for such cases. It should be possible promptly to find and to isolate all sources of infection. Recent developments in the small and micro-film techniques mean that we can easily afford it.

Not one of the seven fine persons on the National Advisory Commission of the Defense Council, however, is aware of what this country can do to eliminate tuberculosis as a major obstacle to national security. We know that Hitler has put all of his active tuberculars together in factories to give—between dying coughs—a few months of service in munition making. This was segregation and service to the state but without regard for the welfare of the individual. If we plan well now, we shall not need such suicide squads for bomb manufacture. Segregate, yes. But let us restore also.

Of the many military medical and health problems in the tropical Americas, the most important is malaria. There is no disease of comparable importance (except the mental diseases) against which we have made less scientific progress, during my generation. Quinine is still the major remedy. Like rubber, originally secured from South America, now our major source of supply is from across the Pacific Ocean —the Dutch East Indies. Holland is no longer able to import, process, and distribute this remedy. Its cartel prevented us from storing a sufficient war chest of our most needed medical strategic material. All of Central and South America now look to us to supply their needs. For two years I have been concerned with this problem. It is not yet solved. No major military operations in the tropics of this hemisphere are possible without quinine or the equally potent German synthetic—atabrine. Here is another job for a National Coordinator on the medical front.

Another strategic medical material, for which we are dependent upon foreign sources, is opium. For four years I have prescribed the total annual amounts which could be imported into the United States. Before and after Munich, I aided our commercial importers to build up a war chest of opium and morphine. In the vaults at Washington, formerly used to store gold, we have stored enough morphine for at least three years. Our regular source has been from the Eastern Mediterranean, now closed. Before this supply is exhausted, we can if necessary grow in certain areas of the United States the pain-relieving poppy plant. But it must be planned now.

Other diseases require our attention. Next to the venereal diseases, mumps is the most disabling of the acute infections among recruits. Meningitis was a great hazard during the last war. Influenza still is a major threat. During the intervening 22 years, many facts about it are becoming clear, but with present knowledge, effective prevention and control is not possible. Research must be speeded up and coordinated. It may be that the nation which first learns how to control influenza will by this knowledge tip the scales toward victory in the wars ahead. No one now is coordinating our search for the practical prevention of this major hazard to successful defense. Until recent months we could expect aid from medical discoveries in our sister democracies. Now in this country, alone, we must carry the burden. As yet we have not gone forward with it.

When armies are mobilized certain proved immunizations are used. Typhoid fever, yes. Smallpox, yes—since Jenner's discovery of more than 100 years ago. A recently developed toxoid against tetanus is of proved value and will be used routinely. Effective immunization against gas gangrene would be another great aid. By a few months of coordinated effort on the part of commercial, university, and governmental groups, a practical protection against this major war hazard should be perfected. Here is another job for the Coordinator.

Our first concern may be in tropical America. I have discussed malaria. What about yellow fever? Prevalent throughout large areas of South America, a constant threat to the southern half of the United States, we do not have in this country enough of the effective vaccine against it to immunize one regiment. In spite of the requests from year to year, I have not been able to secure funds with which to produce a reserve supply.

These examples, among many I could cite, illustrate my major thesis. There are many diseases, of great military importance, which we could control if we were given the will, the authority, and the money to do it.

If or when war comes, every 1,000,000 men mobilized need 7,500 doctors drawn from civil practice. Dentists, nurses, sanitary engineers are needed too. In the mobilization of 4 million during the last war, more than a fourth of the effective medical men of the country were called to the colors. Whole counties were depleted of doctors. Many medical schools were almost put out of business, because the best men left for military duty. We should not repeat these mistakes. Today we should investigate who should go, who should stay to practice, to teach, to operate an essential civilian service. We have no machinery now to do this. A Coordinator of medical and health preparedness should create the machinery, working with the public health agencies, the schools, and the medical profession itself.

We have a shortage of laboratory technicians. Intensive courses would provide more. Universal training would deplete the ranks of medical students; yet we need doctors each year to replace obsolescence. Some medical and other scientists are vastly more valuable to the country working on their present jobs than they possibly could be in the Army or Navy. Here are other tasks for medical planning through a Coordinator.

Further, let us consider the whole problem of national fitness. The President has recommended that all youth give one year to public service—be trained during this time in some skill. How fit are they from a physical and mental viewpoint? Enrollment should include a careful examination. All correctable defects should receive prompt attention. As yet, there is no organization, no planning of an organization, to do it. This is a task projected.

Let us consider two tasks immediately before us. The National Youth Administration employs 300,000 young people. Here is a measurable group, beneficiaries of the Government. After five years no plan has been worked out to appraise their physical status. Shouldn't we take this group of underprivileged youth and apply our proved medical science to relieve their correctable defects?

Employed by the Work Projects Administration are nearly 2 million people. The Nation wants to use their services; they themselves want to serve in the ways they best can contribute to national safety. What is their physical status? No one knows. I propose that each of them be examined; that we use methods comparable to those of the Draft Boards of 22 years ago, and classify the Work Projects Administration employees physically into three or four classes. Those qualified to become good workmen should be first on the list for training in the industries now short-handed. Those who have remediable defects merit rehabilitation. Up to now no agency has had the authority

or the money to do these two specific jobs which seem important in national preparedness.

If our workers are malnourished, they cannot be efficient in producing what we need for defense. Yet every survey of nutrition, by whatever method conducted, shows that malnutrition in this country is widespread and serious. For example, studies by the Department of Agriculture show that 40 per cent of the people are not getting a diet adequate to maintain good health and vigor. Eight out of every ten in this category do not have an income sufficient to purchase, at market prices, a diet adequate in amount and kind; this in spite of the fact that the foods of which the Nation has an apparent surplus are those in which the dietary of so many is deficient—milk and milk products, citrus fruits, green vegetables, and meat.

Not through any pity for their working people, but because their scientists proved to them that it was an essential to national power, the Germans began several years ago to provide for the working masses a diet better than ours have now. We have made a beginning in this direction through the food-stamp plan. What we need is an intensive national drive, with rigid scientific controls, to use the food we have to improve the fitness of our manpower.

Though I would not presume to draw up a blueprint for the whole effort of health preparedness, each of the problems mentioned needs prompt attention. With authority from the National Defense Council, several committees of experts, both official and professional, should undertake special responsibilities. What seems now a huge, illimitable job is, in reality, a composite of measurable tasks. There is a competent person to do each, if it is assigned to him. There is the will among our professions and among our citizens which will see that each is done. But I repeat, the first step is a strong leader in the National Defense Council to see that the country's needs are met for physical and mental preparedness, for health and medical mobilization, for peace or war. At the same time he would serve to unite the efforts of official, professional, commercial, and voluntary groups in our unified drive for aggressive strength.

In the past there has been division of opinion and occasional dissension among our professions concerning methods proposed to bring better health and a higher standard of medical care to our people. In the face of danger it is the democratic way—even the herd instinct—to unite for the agreed objectives of safety. We cannot now afford controversies. The preparedness of our manpower for national safety is not controversial. Given a hand in the planning, all of us together, official and professional, can work out methods in which we all believe.

There is no time for dogged adherence to outworn patterns, nor for a major change in proved forms of medical practice. Medical science grows, expands, opens up new possibilities for saving life and building strength. In the application of its basic sciences, medical practice must expand also to meet the new demands of the Nation for self-preservation.

In the dictatorships, the state is served by sacrifice of the individual and enslavement of the men of science. If our democracy is to stand, we—as doctors, as health officers, as health workers, as citizens—of our own free will because we know it is necessary, must put medical science to work now, fully, to make our men as good as our machines.

The man who has a clear sense of the individuality and sacredness of each person and each moment of time will yet run into confusion and distortion unless he backs his foreground view with the vista of the distant, the past and the future, the background of the community life out of which this individual has emerged and to which he belongs. The only justice to one individual is justice to all. . . .

The humanitarian and the scientific sides of our work need each other as man and woman do. Science without humanity becomes arid and, finally, discouraged. Humanity without science becomes scrappy and shallow.—Richard C. Cabot, M.D., "Social Service and the Art of Healing."

Public Relations Committee

CHESTER D. SWOPE, D.O.
Chairman
Washington, D. C.

NATIONAL DEFENSE RESOLUTION

WHEREAS the President has indicated the necessity for an appraisal of the defense resources of this country and the development of ways and means for their most effective use in the event of war; and

WHEREAS provision for utilizing the services of physicians for the care of those serving in the armed forces and in the war industries as well as those otherwise engaged in civil pursuits, is in the interest of preparedness; and

WHEREAS the training of young men and women to become physicians and the preservation of educational institutions for the purpose are necessary for the maintenance of the national health; and

WHEREAS provision of the services of osteopathic physicians and osteopathic hospitals has been expressly deemed by Congress to be an integral part of the services provided by the Government to (1) its civil employees who become injured or ill due to their employment, and (2) in peacetime, to officers and enlisted men of the reserves of the Army and the Navy, who incur injury or illness in line of duty; and

WHEREAS there is legal authority for the provision of osteopathic services to members of the regular armed forces in times of peace or war by the appointment of osteopathic physicians to the Medical Corps of the Army and the Medical Corps of the Navy; and

WHEREAS information relating to all osteopathic physicians licensed and practicing their profession in the United States, and their individual qualifications, and other data of assistance in assessing the availability of the osteopathic profession and its institutions, is in the files of the American Osteopathic Association, or ascertainable through its allied organizations in the various States and communities; and

WHEREAS the American Osteopathic Association, representing the osteopathic profession, its hospitals and institutions, is desirous of contributing and cooperating to the utmost of its facilities for the advancement and preservation of the health and safety of the American people;

NOW THEREFORE BE IT RESOLVED that the Public Relations Committee* of this Association take proper steps for making the resources of this Association and the resources of the osteopathic profession and its institutions, as may be, available to the President, the Advisory Commission to the Council on National Defense, the Surgeon General of the Navy, the Surgeon General of the Army, the Surgeon General of the Public Health Service, and other proper officials and commissions, to the end that all osteopathic physicians, hospitals, and institutions shall serve this country in peace and in war according to their professional capacity, training and equipment.

Adopted by the House of Delegates of the American Osteopathic Association in Forty-fourth Annual Convention assembled at St. Louis, Mo., this twenty-sixth day of June, 1940.

SELECTIVE COMPULSORY MILITARY TRAINING AND SERVICE BILL

On July 3 the Senate Military Affairs Committee began holding hearings on Senate Bill 4164, introduced by Senator Edward R. Burke of Nebraska, to provide for a system of selective compulsory military training and service. The bill requires the registration of every male citizen between the ages of 18 and 65. Those between 21 and 45 would be liable for selection for training and service in camps and units of the land and naval forces. Those between 18 and

*Dr. Chester D. Swope, Chairman, Dr. F. A. Gordon, Dr. Frank F. Jones, Dr. Arthur E. Allen, and Dr. R. C. McCaughan.

21, and 45 and 65, would be liable for selection for training and service in home-defense units of the land and naval forces in or near the communities or areas in which they reside.

Exceptions from the training and service provided in the bill are extended to those engaged in the regular and reserve armed forces and in their preparatory academies, and certain civil officials, and conscientious objectors (combat service).

Provision is also made for the *deferment* of the training and service of men who have persons dependent upon them for support, and men who are found to be physically, mentally, or morally deficient, and men who are duly ordained ministers of religion in the regular discharge of their ministerial duties, and men *"whose employment in industry, agriculture, or other occupations or employment or whose work in engineering, chemistry, physics, medicine, or dentistry are found to be necessary in the maintenance of the national health, safety or interest."*

Testifying before the Committee on the first day of the hearing, Dr. James B. Conant, President of Harvard University, said:

> An adequate supply of highly trained civilian experts in medicine and in applied science are essential elements in military defense. A potential enemy could deal us a terrific blow if by some magic process every medical and engineering school in the country could be destroyed tomorrow and every student in these schools annihilated. It takes eight to ten years above high school to train a doctor, four to six years to train an engineer, even longer to train a research scientist. Unless a steady supply of these trained men is kept coming along we have neglected a most vital part of our national defense.

Referring to the section of the bill providing that military training and service may be deferred for men whose work in engineering, chemistry, physics, medicine, or dentistry are found necessary to the maintenance of the national health, safety, or interest, Dr. Conant had this to say:

> I understand the word "work" covers not only those now engaged in those professions whose services are deemed essential to the national health, safety or interest, but also those in training in our universities and schools for these professions. I think some such provision as this is essential. Not essential, mind you, to protect the universities or the schools, but to protect the country.

LIFE EXPECTANCY

Human resources have been vastly increased in the United States since 1900 by the advancement of preventive and curative medicine. The baby born in 1900 could look forward, as the personification of all babies born in that year, to a life of about 49 years. This representative baby born today can look forward (barring the misfortune of a total war) to a life expectancy of about 63 years. If the baby is a girl, the outlook today is 66 years; if a boy, 62 years.

On the whole, each baby born in 1940 can look forward to about 13 more years of life than could the baby born in 1900. Apply this gain of 13 years in added life expectancy to the entire population of the United States, some 130,000,000 persons, and the amount of human resources contributed to the nation by public health and medical progress reaches astronomical figures.—*Illinois Health Messenger*, July 1, 1940.

American Osteopathic Board of Ophthalmology and Otolaryngology

During the recent St. Louis convention of the American Osteopathic Association and allied societies, the following physicians were approved by the American Osteopathic Board of Ophthalmology and Otolaryngology and by the Board of Trustees of the A.O.A. for certificates as specialists in ophthalmology and otolaryngology:

Lawrence M. Bell, Marietta, Ohio
Frederick J. Cohen, Wichita, Kans.
A. B. Crites, Kansas City, Mo.
Wilborn J. Deason, Happy Camp, Calif.
A. C. Hardy, Kirksville, Mo.
Harold M. Husted, Denver
L. S. Larimore, Kansas City, Mo.
Charles M. LaRue, Columbus, Ohio
R. S. Licklider, Columbus, Ohio
L. A. Lydic, Dayton
G. H. Meyers, Tulsa, Okla.
C. C. Reid, Denver
T. J. Ruddy, Los Angeles
William H. Schulz, Cleveland
W. J. Siemens, Seattle, Wash.
C. O. Sites, Hillsboro, Ohio
Ralph D. Vorhees, Cleveland
Jerome M. Watters, Newark, N. J.

The following physicians were approved for certificates as specialists in otolaryngology:

J. Ernest Leuzinger, Philadelphia
H. J. Marshall, Des Moines, Iowa
C. Paul Snyder, Philadelphia

American Osteopathic Board of Surgery

During the recent St. Louis convention of the American Osteopathic Association and allied societies, the following physicians were approved by the American Osteopathic Board of Surgery and by the Board of Trustees of the A.O.A. for certificates as specialists in surgery:

Edward T. Abbott, Los Angeles
Ralph P. Baker, Lancaster, Pa.
Orin O. Bashline, Grove City, Pa.
W. Curtis Brigham, Los Angeles
Harry L. Collins, Chicago
George J. Conley, Kansas City, Mo.
W. D. Craske, Chicago
F. A. Dilatush, Lebanon, Ohio
H. E. Donovan, Raton, N. Mex.
Wayne Dooley, Los Angeles
Edward G. Drew, Philadelphia
Lucius B. Faires, Los Angeles
Harold A. Fenner, North Platte, Neb.
B. L. Gleason, Larned, Kans.
Walter V. Goodfellow, Los Angeles
Andrew R. M. Gordon, Los Angeles
C. Denton Heasley, Tulsa, Okla.
J. Willoughby Howe, Los Angeles
Wm. Willis Jenney, Los Angeles
A. C. Johnson, Detroit
Edward B. Jones, Los Angeles
Anton Kani, Omaha, Neb.
Roy D. Kohl, Los Angeles
Howard E. Lamb, Denver
Earl Laughlin, Jr., Kirksville, Mo.
George M. Laughlin, Kirksville, Mo.
Orel F. Martin, Boston
Robert Rough, Los Angeles
J. P. Schwartz, Des Moines
R. A. Sheppard, Cleveland
M. S. Slaughter, Webb City, Mo.
H. Willard Sterrett, Philadelphia
Albert B. Wheeler, Carthage, Mo.
George C. Widney, Lexington, Neb.
Q. W. Wilson, Wichita, Kans.
Philip A. Witt, Denver

Department of Public Affairs

WALTER E. BAILEY, D.O.
Chairman
St. Louis

BUREAU OF OSTEOPATHIC LEGISLATION

JAMES O. WATSON, D.O.
Chairman
Columbus, Ohio

STATE LEGAL AND LEGISLATIVE

California

Dr. Ernest G. Bashor has been elected president of the Los Angeles City Board of Health.

OSTEOPATHIC PHYSICIAN EXONERATED

Dr. Amanda I. Lowe, Hollywood, was found not guilty on June 15 of charges of murder and illegal surgery in connection with a woman's death. It was shown at the trial that Dr. Lowe was not even in the state at the time the operation was performed.

District of Columbia

H.R. 9525, to reorganize the government of the District of Columbia, was reported to the House by the Committee on the District of Columbia with a recommendation that the chief medical officer must be a "physician" instead of, as the bill originally read, "a doctor of medicine."

Michigan

"USE TAX" APPLIES TO PROFESSIONAL MEN

A newspaper report late in May told of replies being made to inquiries by the Michigan State Board of Tax Administration. It explains that: "The use tax act is a natural corollary to the sales tax act." The use tax is a levy of three per cent of the purchase price on all personal property stored, used or consumed in Michigan on which an equivalent sales tax has not been paid in this or any other state. It applies to purchases made from out of state sellers and delivered in Michigan.

Ohio

MUNICIPAL HOSPITALS MAY NOT CONTRACT WITH NONPROFIT SERVICE ASSOCIATIONS

On February 26, 1940, the office of the attorney general of Ohio rendered opinion No. 1919, the syllabus being: "The authorities in charge of a municipally owned hospital may not enter into a contract with a nonprofit hospital service association organized pursuant to the provisions of sections 669, et seq., General Code, whereby the hospital is obligated to furnish hospital care at a stipulated price for a definite period of time to subscribers of the nonprofit hospital service corporation."

Tennessee

BASIC SCIENCE PLANS—CORRECTION

THE JOURNAL for July on page 531 quoted an Associated Press report that the Tennessee Medical Association had voted to seek basic science legislation with exemptions for, among others, chiropractors. It seems that the newspaper clipping was in error and that it should have read chiropodists.

RE-REGISTRATION OF OSTEOPATHIC LICENSES

Sept. 1.—Nebraska, $1.00. Address Charles A. Blanchard, D.O., Secretary, 1212 Sharp Bldg., Lincoln.

CORRECTION

An error occurred in the "Annual Report of the Executive Secretary," page 502, July JOURNAL. The sentence beginning on the forty-fifth line, right-hand column, should have read: "There are 157 osteopathic hospitals, housing 3,040 beds, enough at the accepted level to care for the hospital needs of approximately 700,000 persons."

BUREAU OF BUSINESS AFFAIRS

R. C. McCAUGHAN, D.O.
Chairman
Chicago

COMMITTEE ON PROFESSIONAL LIABILITY INSURANCE

JAMES O. WATSON, D.O.
Chairman
Columbus, Ohio

PROFESSIONAL LIABILITY INSURANCE

Apropos of the fact that much of the malpractice insurance carried by osteopathic physicians and surgeons is underwritten by Lloyd's of London, the following article from the weekly insurance newspaper, *Underwriters' Report* for June 20, 1940, is particularly significant. The publication is a technical one supported by the advertisements of stock insurance companies, and subscriptions of general insurance men at large. Its name might cause a layman to believe that it was by way of being a house organ of Underwriters at Lloyd's, London, whereas as a matter of fact it is an American magazine primarily supported by American insurance companies and entirely circulated within the United States.

"It will be recalled that at the end of last August Underwriters at Lloyd's established a trust fund in this country in approximately the sum of $40,000,000 under the sole jurisdiction of an American Trustee, the City Bank Farmers Trust Company, New York. [See A.O.A. JOURNAL for October, 1939, p. 139.]

"This trust fund was created by the Committee of Lloyd's for the announced purpose of insuring in the event of war the meeting of obligations under insurance contracts issued by Lloyd's Underwriters on risks in the United States.

"Since that time this trust fund has been functioning without difficulty and without delay, and all premiums on United States business have been paid into the trust fund and all losses paid out of it. The trust fund is at present reported in excess of $60,000,000 and still increasing.

"The fund is divided roughly into 30 per cent in United States Government bonds, which are in the custody and in the vaults of the City Bank Farmers Trust Company. The remaining 70 per cent of the fund is in cash and is on deposit in several large New York banks; one large Boston bank, and several large Chicago banks. The cash fund is in the name of the trustee, the City Bank Farmers Trust Company, and can only be drawn by the trustees.

"As in the past, all future premiums received by underwriters at Lloyd's, London, on insurance contracts on risks in the United States will continue to be deposited in the trust fund, it is reported.

"It will be recalled that the trust fund was created with the consent and approval of the British Board of Trade, the British treasury department, and the Bank of England, who were definitely advised that the object in view was to create a trust that would be beyond control of the British Government. The trust itself is governed by the laws of the State of New York applying to trusteeship and definitely provides that claims against Lloyd's which may not be met within thirty days may be enforced against the trust fund. In the event of any of the 1900 underwriters in the 240 syndicates at Lloyd's ceasing to underwrite, or dying, the trust as to such underwriter will continue for four years and until all claims against him have been completely satisfied.

"Under Article 17 of the trust agreement it is provided that this agreement may not be terminated while Great Britain is engaged in war with a European power, and even if terminated after peace is declared, the trust will still stand as to all business written up to the date of such revocation, it is contended.

"As an entirely independent matter, and not in any way related to the trust, underwriters at Lloyd's have statutory deposits in the States of Illinois and Kentucky, approximating in the case of Illinois about the sum of $3,500,000 and in Kentucky $350,000.

"When the trust fund was created it was estimated that it was sufficiently large to meet all of Lloyd's claims in this country with a very substantial margin. The fact that the Trust has steadily increased in amount since its creation last August indicates that the fund is considerably more than actually necessary to fully protect the holders of Lloyd's contracts in this country.

"The American trust fund is in addition to other safeguards designed to insure complete fulfillment of Lloyd's policies. Underwriters are not permitted to withdraw funds accruing to their account until at the end of at least three years from the expiration of policies and until all obligations are satisfied.

"As already stated, all of the foregoing is in addition to the American trust and entirely independent of it.

"It has already been stated that the trust fund was beyond control of the British Government, and even if England met with disaster the trust fund itself would still be beyond control of anyone except the trustee."

Eye, Ear, Nose and Throat Section

SINUSITIS*

A. B. CRITES, A.B., D.O., M.D.
Kansas City, Mo.

The nasal accessory sinuses, while undoubtedly more essential to some of the lower animals having a highly developed olfactory sense than to humans, are still very important organs to the latter in this modern civilization. They aid the nasal chambers in warming, moistening and properly preparing the inspired air for its reception by the lungs. It is the vibration of the air in these enclosed cavities incited by the vocal cords that gives timbre and quality to the singing and speaking voice. The cellular construction of the sinuses gives great strength to the skull without undue weight. The manner in which they are grouped about the eye protects that most valuable organ from trauma and from changes of temperature, whether external, intranasal or from within the mouth.

The incidence of sinusitis seems to be increasing definitely in recent years. This may be due in part to better diagnosis. A greater factor in the causation of present-day nasal inflammation is the effect upon the human organism of modern civilization. Our grandparents were exposed to the inclemencies of the weather. They lived in homes provided with open fire places and an abundance of pure outside air with a good moisture content in the winter. They slept in cold bedrooms. The mucous membrane of their upper respiratory tracts naturally functioned better than ours, pampered as we are by living and working in steam-heated rooms where the air is dryer than that of the Sahara desert all winter. They did not need to contend with crowds in chilled movie theaters in summer; neither were they exposed to the frequent traumatic injuries incident to present-day rapid transit.

The many predisposing causes of inflammatory disease of the nose and sinuses are best explained by grouping them about the well-recognized physiopathological law; when the drainage and ventilation of mucous membrane-lined cavity is impaired or blocked, the conditions are favorable for the growth of pathogenic bacteria. The intranasal bony lesion is of foremost importance. The lesion usually originates from trauma in infancy or childhood, the extent of the bony lesion becoming greater with the development of the nose, face and sinuses during later childhood. The nose is the most prominent feature of the face and hence most exposed to trauma. Minor injuries to the nose received during childhood, many of which receive little attention at the time and are soon forgotten, account for the fact that among adults 75 per cent of the nasal septa are deflected and nearly an equal number have some slight imperfection of the external nasal contour. The attention of both the laity and the profession needs to be directed to this fact, that injuries to the nose in early life (osteopathic lesions if you will) bear an important relation to nasal obstruction with its almost endless chain of associated symptoms and diseases.

The character of the subsequent inflammation and the final result are determined partially by the location of the obstruction in reference to the various structures of the nose and to the accessory sinuses. Anterior and inferior obstructions are the usual cause of turgescent and hypertrophic rhinitis, affecting chiefly the inferior turbinate; obstructions higher in the nose, in the region of the middle turbinate and the infundibulum, cause the retention of the secretions and interfere with the ventilation of the superior meatus and the accessory sinuses, thus lowering the resistance of the tissues, impairing ciliary activity, and establishing a marked predisposition to infection and inflammation of the sinuses. The inflammation may be catarrhal or suppurative, acute or chronic in type. The long-continued mild irritation excited by obstructive lesions in the middle turbinate region results in hyperplastic changes and impairment in function of the ciliated epithelium. The inflammation may extend by continuity of tissue to any or all of the sinuses, to the eustachian tube, and on to the middle ear.

Extranasal predisposing causes of sinusitus must not be entirely overlooked. Age seems to be a factor, possibly because the child and young adult does not show proper discretion as to his habits. The young are likely to dress improperly, lose sleep, drink or smoke to excess, and take foolish chances of exposure. Certainly a very changeable climate is a predisposing factor in sinusitis. Certain constitutional diseases as diabetes, syphilis and all disease due to faulty metabolism affect the tissues of the respiratory tract and predispose them to infection. Indirectly heredity is a predisposing factor in that certain anatomical conformations of the nose and face may be transmitted from parent to child. The high Gothic arched palate seen in families is an example. In the young child adenoids definitely predispose to sinusitis and they should be removed promptly. Improper diet and indiscretions of diet are demonstrable factors in sinusitis. The proper diet for the sinus sufferer should be low in acid ash-producing foods, high in fresh alkaline ash-producing foods, contain much calcium and chlorophyll, contain all the vitamins, and be low in salt but high in natural mineral content.

Foreign bodies within the nose may cause sinusitis and carious teeth may cause infection in the antrum.

Among the immediate exciting causes of sinusitis are included the common cold, influenza, the various exanthematous and other infectious fevers. The inflammation thus started is more likely to become chronic in those cases in which there are obstructive lesions in the nose. In some cases it is only after many years that the involvement of the sinuses become obvious enough to attract the attention of either the patient or the physician.

The pathological changes which occur in the mucous membrane and bony walls of the sinuses in the course of suppurative inflammation are what might be expected in cavities lined with ciliated columnar epithelium. At first, the submucous tissue is infiltrated with serum, while the surface is dry. Leukocytes also fill the meshes of the submucous tissue. The capillaries are dilated so the mucous membrane is red. After a few hours or in a day, the serum and leukocytes escape through the epithelial covering of the mucosa, where they become admixed with bacteria, epithelial debris and mucus and block the action of the cilia. The cilia are the most potent factor in maintaining and restoring nasal health. Other defense factors include phagocytic cells, antibodies in varying strength and lysozymes to which the nasal secretions owe their antiseptic power.

At the onset of infection defense is concerned with keeping up the ciliary cleansing, pouring out additional mucus and

*Delivered before the Forty-Second Annual Convention of the Iowa Society of Osteopathic Physicians and Surgeons, Des Moines, May 9, 1940.

mobilizing phagocytes and antibodies. The earliest sweepings of toxins and bacteria down the pharynx and toward the esophagus are the most toxic because the immunity of the tissues has not yet been established. Hence we have the early sore throat, laryngitis, malaise and other symptoms. When early resolution fails to take place, the sinusitis progresses with more local discomfort and more disturbance of function. Added congestion occurs and there is an outpouring of mucopus in reaction to the bacterial invasion of the mucosa. The congestion, the overload of secretions, and the prolonged contact with toxins impair ciliary activity. Further interference comes from the drying of the purulent film. Large areas of cilia may become paralyzed, allowing the accumulation of mucopus.

Drainage of the sinuses is further impaired because blockage of the meati shuts off the essential stimulation to ciliary activity that comes from the positive and negative alternation of air pressure during respiration. Without doubt the worst interference is from the drying, which paralyzes all the affected cilia. At times capillary hemorrhage occurs and blood is mixed with the secretions. At first the secretions are thin and watery, later they become thick and tenacious from coagulation of the fibrin of the serum. In many cases resolution by absorption of the exudate and the cessation of the discharge of leucocytes takes place in a week or two. In other cases, the inflammation passes from the catarrhal to the purulent type, with leucocytes being thrown out in immense numbers. Resolution is still possible, though not probable, as the tissue changes are not yet of a fixed type. Unless the process is speedily arrested, the tissue changes become permanent and chronicity is established. If the ostia of the sinuses are open, the discharge of pus may continue indefinitely with little or no pain. If the ostia are closed, the purulent secretion is retained causing pressure symptoms. If the discharge cannot escape, the point of least resistance bulges before the pressure of confined pus. Grave or fatal complications may result from extension into the orbit or cranial cavity.

The diagnosis of suppurative sinusitis is relatively easy. The patient suffers pain usually in the region of the affected sinus. If the sinus is of the anterior group, there is tenderness on pressure over it with often redness and swelling. The patient may experience vertigo particularly upon changing his position. There may be disturbance or loss of the olfactory, visual or auditory senses. Intranasal inspection reveals an altered mucous membrane, oftentimes pus, which upon shrinkage can be seen emerging from the ostia of the one or more sinuses infected. Transillumination is of value in antral diagnosis, less certain for the frontal sinuses, merely suggestive for the anterior ethmoids and of no value for the posterior group of sinuses. Chief dependence must be placed upon x-ray pictures in questionable cases. Several plates should be taken, the most useful positions being the posteroanterior at a 23 degree angle, the 107 degree or Granger, which shows the roof of the sphenoid, the lateral position (of value preoperatively), while the three point position superimposing the cells upon the orbit is valuable in diagnosis of ethmoid disease. Puncture and washing, particularly of the antrum, is easy and definite in that it permits a study of bacterial content.

The diagnosis and eradication of catarrhal sinusitis, while more difficult, is just as important as in the suppurative type. A catarrhal sinusitis is just as likely as suppurative sinusitis to act as a focus of infection leading to neuritis and arthritis. When cervical and upper thoracic lesions will not stay corrected but constantly recur, we should suspect sinus involvement. Asthenopia frequently, and optic neuritis less often, are caused by sinusitis. A toxemia with such attendant manifestations as anemia, debility, inability to concentrate or think clearly or with symptoms vaguely ascribed to neurasthenia, may originate in connection with catarrhal sinusitis. Inflammatory conditions of the pharynx, larynx and bronchi may be induced and maintained by the irritation from the backward flow of secretions from the nasal accessory cavities. Asthma may sometimes yield to a timely interference with the provocative sinus condition. Chronic gastric disturbances may even be the result of swallowing the discharge, though the explanation more probably lies in the reflex connection of the sensory fibers of the fifth nerve and the pulmonary or gastrointestinal branches of the vagus. The patient with constant or frequent colds is really having exacerbations of a catarrhal sinusitis. Frequent attacks of sneezing mean either infected ethmoids or a hyperesthetic rhinitis; the presence of a predominant eosinophilia in the secretions obtained is a definite diagnostic finding in the latter condition. Postnasal discharge may be the only subjective symptom present, but when inspection of the pharynx shows it to be granular with red, swollen areas behind each posterior pillar, the inference of infection above is definite and positive.

Curing an inflammation of a sinus depends upon several factors: the establishment of free drainage and ventilation, the removal of the morbid material, the elevation of the local resistance of the tissues and the general resistance of the patient. To effect this latter factor dietetic and hygienic regulation may be necessary. Osteopathic procedures, particularly splenic stimulation and the so-called lymphatic pump have proved their worth in increasing the systemic resistance when the patient's very life hung in the balance. The drainage accomplished by the cervical lymphatic pump treatment from the upper respiratory tract makes it a very valuable addition to the osteopathic specialist's therapeutic armamentarium.

It has been said that the way to cure inflammation is to increase it. This is especially true in an acute catarrhal sinusitis which is simply an extension of the same inflammation of the nasal mucosa in the course of a coryza. General measures may be all that is necessary to promote the reaction of inflammation and restore the activity of the ciliated columnar epithelium. If local measures are attempted, shrinking agents are likely to prove disappointing because of their reaction. Experimentation on living tissue conducted at the University of Iowa and elsewhere has shown that the mild silver proteins are effective agents for increasing ciliary activity. Other drugs commonly used intranasally either slow or completely stop the action of the cilia, some temporarily, others permanently. These experiments have made scientific the former empiric use of mild silver protein packs. In my hands the packs when augmented by the infra-red generator over the affected area do quite effectively promote the reaction of inflammation, deplete the engorged mucosa, relieve pain, initiate drainage from the sinuses and restore ciliary activity.

The chronic catarrhal sinus has become chronic because there is some obstruction to free drainage and ventilation. The obstructive lesion is most often a thickened or deflected septum with many times secondary turbinate abnormalties. The first step in the local treatment is a submucous resection of the nasal septum followed at once by sufficient plastic work upon the turbinates to restore them to their proper size, shape and position and leave the sinus ostia free for drainage and ventilation. This operative work is not often done before the age of twelve as the septum is needed for nasal support until that age. In older patients the properly preformed submucous resection removes the obstruction without weakening the nasal bridge. No functioning mucous membrane is removed, the reaction from the operative trauma tends to change the chronic inflammatory process into an acute one, which, with adequate aftercare, can be treated satisfactorily and the ciliary activity of the mucous membrane restored. The submucous resection of the nasal septum, performed when definite indications exist and before permanent pathological changes have developed in the sinus mucosa, comes as near giving 100 per cent satisfactory results as any operation in the category.

Suppurative sinus infection calls for removal of the morbid material as well as the establishment of free drainage and ventilation. The individual sinus can be irrigated through its natural ostium or in the case of the antrum of Highmore a puncture in a more dependent position can be made. As

the sinus is irrigated at intervals, the character of the mucopus obtained is a guide both to prognosis and to the type of future treatment required. If the material becomes more mucoid, less purulent and less in quantity the prognosis is good with more treatment of the same type. If the material obtained becomes more purulent containing less mucoid elements, then the case is becoming chronic and steps must be taken to provide more adequate drainage and proper ventilation. The postural method of sinus displacement by suction is easily done in cases where the infection involves several of the sinuses, but has the obvious disadvantage in that the clear sinus with an open ostium receives the solution while the infected sinus with an obstructed ostium is not treated at all. Surgical procedures should be avoided as much as possible during the height of an acute attack of sinusitis. Not so many years ago radical intranasal procedures with ripping out of entire turbinates were in vogue. Of necessity disastrous results followed; so much so that in recent years the pendulum has swung too far the other way. Now, many chronic intranasal infections that could be treated effectively by simple and rational surgical procedures are palliated or put off because of a prevalent mistaken idea that intranasal surgery is ineffective or that one operation of necessity later calls for another.

In the satisfactory treatment of the chronic purulent infected sinus, surgery is a necessity. However, the more radical surgical procedures are seldom in order. In most instances all the needed work can be done from within the nose and without sacrificing the mucous membrane lining the sinus or any other mucous membrane in the nose. Usually a submucous resection is first needed no matter which sinus is infected. After this is done, the sphenoid sinus can have its ostium enlarged under a mucous membrane flap that is later turned into the sinus. The procedure is facilitated by fracturing the posterior part of the middle turbinate over to the lateral wall exposing the ostium, removing the floor from the spheno-ethmoidal recess and permitting better ventilation and drainage from the posterior group of sinuses. The ethmoid cells seldom need to be exenterated unless they have undergone polypoid degeneration; even then they can be removed lateral to the middle turbinate by fracturing it over toward the septum. Saving the middle turbinate intact is insurance against the spread of infection up through the cribriform plate to the meninges. The frontal sinus may be drained freely by removing under a flap the agger nasi which deflects the frontal sinus duct back into a roundabout course and thus short-circuiting the frontal duct. The use of the flap prevents postoperative stenosis from cicatrix formation, as it lines the newly formed channel. The maxillary antrum can be opened under a flap beneath the inferior turbinate, from the pyriform process interiorly back to the posterior wall of the sinus, and from the attachment of the inferior turbinate down to the floor of the nose. Laying the flap over into the sinus facilitates healing and leaves a permanent opening. Packing with iodoform gauze and leaving this antiseptic in constant contact with the infected mucosa for a full week effectively destroys the infection and obviates the necessity of irrigations afterwards. Sinus surgery must be rational, not ultra-conservative. It may seem radical but is not if there is no destruction of turbinates or mucous membrane.

SUMMARY

The paranasal accessory sinuses perform many useful functions for civilized man. However, the demands of modern civilization are throwing an increasing burden upon the upper respiratory tract with a marked increase in the incidence of inflammation of the sinuses. Trauma to the nose in early life is responsible in many cases for the specific causative lesion, a deflected or hypertrophied septum that interferes with drainage and ventilation. Sinusitis is responsible for many systemic disorders. Careful diagnosis and adequate treatment is necessary to correct the intranasal lesions, provide proper ventilation and adequate drainage, and so normalize the upper respiratory tract.

512 Bryant Bldg.

Proctology Section

POSTSURGICAL STRICTURE*

FRANK D. STANTON, D.O.
Boston

Definition.—Postsurgical anal stricture is a condition of the integument due, usually, to the surgical removal of the anal lining and the skin of the perineum at the time of operation for hemorrhoids and other conditions.

Etiology.—The title of this short paper and the definition both include the etiology. If it were not for the danger of offending other surgeons, I might say that postsurgical stricture of the anus is the result of old-fashioned rectal surgery. The etiologic factor is usually that the surgeon doing clamp and cautery pulls into his clamp more integument than he should. If, as is sometimes the case, he draws a portion of the sphincter musculature into the clamp, the condition is likely to be one of postsurgical incontinence. Postsurgical stricture of the anus must be a most rare accident at the hands of those proctologists who employ the methods which have been developed during recent years.

Treatment.—The treatment for postsurgical stricture of the anus may be employed also in contracture of the anus. In speaking of contracture of the anus, we have in mind a condition very commonly, but erroneously diagnosed as "spastic sphincter." Spastic sphincters are seen, but most of the conditions diagnosed as spastic sphincters are not conditions of the sphincter at all, but are conditions in which the anal canal is lined by a ring of integument which does not distend as it should when the bowel content is expelled.

Contracture of the anus is usually congenital. It is most commonly a defect in embryonic development. That is to say, it is a close relative of such conditions as cleft palate, harelip, open fontanels, spina bifida, imperforate anus, hooded clitoris, hypospadia, and pilonidal sinus. Many conditions of the anus which give trouble during life are either congenital or develop as the result of congenital defects. Some day we will probably be shown by some patient scientist that congenital defects of the anus cause more trouble during life than any other kind of congenital defect with the possible exception of those in the brain.

To come back to my subject of postsurgical stricture of the anus we find, upon examination of nearly all of these conditions, that so much of the skin and the membrane and the transitional covering of the anus has been removed surgically that the patient now has an opening so small that, although the muscles are still intact, the opening will not admit the examining forefinger nor even the little finger and, sometimes not even an instrument the size of a lead pencil.

The history of the case will reveal that the patient has been operated upon. The operation is usually found to have been clamp and cautery. The skin is usually smooth, pink, and glistening. Upon questioning the patient, we find that following the operation the anus was stretched many times in an endeavor to keep it from contracting. Very often dilators have been prescribed. Such procedures have probably never been of any help in the treatment of these conditions.

Our treatment of postsurgical stricture of the anus is simple. I have stated it many times at conventions during the past ten years. It has been suggested that I give it again because during the repetition a few very important and one very vital detail has been omitted:

1. Establish anesthesia—general, spinal, caudal, rectal, or local.

2. Four incisions should be made—anterior, posterior, right and left—or as the "clock" surgeons might say, twelve o'clock, three o'clock, six o'clock, nine o'clock. It makes no difference whether the twelve o'clock is a Trendelenburg

*Delivered before the Proctology Section at the Forty-Fourth Annual Convention of the American Osteopathic Association, St. Louis, June 25, 1940.

twelve or a Haynes' table twelve; whether it is the twelve o'clock preferred by the operators who place the patient on the right side or those operators who place the patient on the wrong side. These incisions should be made before any instrument is passed which would be large enough to traumatize the anal lining. Therefore, in some cases, the incisions will be made from the outside with a scalpel and extending into the anus as far as is practicable. With an assistant drawing down on the anal lining, the posterior incision may easily be carried as high as the pectinate line. With this incision made, the smallest Brinkerhoff speculum may now be passed and the operator, if he uses the Post cautery, should change from his scalpel to the Post cautery and carry each of the four incisions as far up into the anus and rectum as is necessary to incise through all of the scar which was left following the operation which preceded the stricture. The cautery should be used also to cauterize the edges of all of the wounds and all of the wounds should be meticulously carried upward so to make sure that that part of the stricture which has been causing most of the patient's trouble will be taken care of. My reason for emphasizing this upward or inward extension of the incisions is that this is a highly important point which has not been mentioned when the technique for this operation has been repeated by others. One or more of these incisions should be carried through the external sphincter muscle, severing the muscle, and it should be carried upward to sever a liberal portion of the fibers of the internal muscle. In our experiences such incisions are far preferable to any form of divulsion, be they instrumental or digital. The chief reason probably is that the muscle will let go where you want it to let go; that there is less trauma; less bruising; and less resultant infiltration of the muscles by fibrous scar tissue.

With this procedure as with all of our procedures, we must bear in mind that we are dealing with a highly sensitive and exacting mechanism and that whenever we traumatize the tissues such trauma must be repaired. Since the human body repairs fibroconnective tissue and epithelium by fibrosis or formation of scar tissue, the amount of scar tissue laid down into the tissues will be in direct proportion to the amount of trauma. One or two good clean incisions cannot, it seems to me, set up anything like the amount of trauma which is done by divulsion.

3. After making sure that the incisions are carried well through the skin and membrane and that they extend well outward onto the skin, perhaps an inch to an inch and a half outward from the margin of the anus in the average sized patient, we should then dress each of the four wounds with a pledget of cotton, moistened with thromboplastin and sprinkled with Butesin. The object of this dressing is to keep the cut edges of the skin and membrane separated and also to control minor bleeding.

If, on extending the incisions upward into the hemorrhoidal area, bleeding should develop, a suture ligature of size 0, plain catgut, using an Anchor Brand needle (½ circle, Taper Point, No. 1824-6), should be applied. The needle should be inserted above the upper limit of the wound. It should be passed sufficiently deep to pick up the hemorrhoidal vessels, but should *not* pass into the musculature of the rectum. This ligature is seldom necessary. Usually it will be found that patients having had such a clamp and cautery operation as to cause anal stricture will *not* at the cite of operation have *any hemorrhoidal vessels left.*

4. These patients should be dressed every two or three days. The chief purpose of these frequent dressings is to see that the cut edges of the wounds remain apart. The mucous membrane will extend itself across the wounds quite rapidly; the skin a little slower. If, by good management, each of these wounds adds a quarter of an inch of skin and membrane to the lining of the canal and of the lower rectum, we will then have added a full inch to the circumference of the canal.

If when these wounds are healed, we find that we have not succeeded in making the canal large enough, we then, in a manner, repeat the operation. This time, however, we make our incision right posterior, right anterior, left posterior, and left anterior. I would not attempt to figure these out on the clock for you, but this will not be necessary. In fact, this second operation will not be necessary after the surgeon has employed this technique on one or two cases. The incisions given in the first instances as much more satisfactory. The incisions which I have suggested for the second operation are not located in areas that will behave as well as the front and back and lateral incisions. The preference for the first incisions is brought about by the fact that the area will split, front and back, into even halves and right and left into even halves. As these incisions grow together, the growth is even and symmetrical. The incisions behave in a manner very similar to fistula incisions. We find that the incisions of a type 1, type 5, or type 3 fistula, as they are carried through into the internal openings, heal evenly while the incisions for type 2 and type 4 fistulae do not behave nearly so well because the two halves of the cut are of different proportions.

6. The patient's bowels should move daily, preferably with the help of enemas. The water for these enemas should be hot, not warm, and to each two quarts of hot water should be added a heaping tablespoonful of bicarbonate of soda which should be carefully dissolved in the water. This enema will keep the patient comfortable and it will do much to stimulate the granulation of the skin and membrane.

7. We must bear in mind that skin and membrane granulate across the wound from the two edges; that this granulation will take place beneath any cauterized tissue; therefore, in dressing the wounds, we should not remove what may seem like scab along the edges of the skin. The center of the wounds should be kept clear of granulation tissue other than skin or membrane. Silver nitrate, 75 per cent, on the tip of a wood applicator may be carefully drawn through the center of each wound followed by saline for neutralization. This may be preceded by application of cocaine or pontocaine. We should be very careful, however, not to have the silver nitrate damage the edges of the wounds.

8. These patients seldom have pain following this operation. For medication we prescribe amytal and amidopyrin. For local anesthesia we are still using nupercaine 1:1000. It has been our policy to make a trial of all the new anesthetics as they have come on the market. We have no interest in any of them any more than to want the best available. Nupercaine is not perfect, but in our hands it is the best so far.

The pathological condition in these cases is self evident. The symptoms may include any of those usually occurring in rectal disease—constipation, pain due to fissure, bleeding due to fissure, itching due to fissure, or irritation. The diagnosis is plainly evident on examination. The prognosis is good.

229 Berkeley St.

THE YEARLY INDEX TO A.O.A. JOURNAL

This issue of THE JOURNAL contains the yearly index which may be found following the final page of advertisements. Fifteen pages are devoted to the yearly index, the compilation of which requires many hours of work. An examination of the index will disclose that it is divided into three principal parts: an Author Index, a Subject Index, and a Current Literature Department.

Under the Subject Index all reading matter published in THE JOURNAL during the past year (September, 1939, to August, 1940) is listed (according to subject) and cross-indexed for easy reference. The Subject Index contains also a list of books reviewed, both by author and by subject, a record of conventions and meetings held during the year by divisional, district and allied societies, and a separate Legal and Legislative Index arranged according to states. The Current Literature Department lists by authors the subject matter from other scientific periodicals reviewed in THE JOURNAL.

The yearly index is the work of Dr. R. E. Duffell and Miss Lillian Peterson of the Editorial Staff in Central office.

Current Medical Literature

Abstracted by R. E. Duffell, D.O.

Vaccines and Vasoconstrictors for Colds

Aside from the possibility that germs of more serious diseases may be involved in a relatively mild upper respiratory infection, it appears that those ills which may be validly classed as colds are caused by a variety of viruses. The virus is air-borne, carried in droplets from the mouth and nose of an infected person. Isolation of infected persons during the early stages would doubtless reduce the incidence of these infections. *No convincing evidence that vaccines are especially valuable in preventing colds has been produced,* but it seems likely that bodily resistance against colds can be increased by concentrated preparations of vitamins and by a good general diet. (Italics ours.)

Treating colds with drugs or strong vasoconstrictor inhalations may do more harm than good. To quote on this point from an editorial on colds in the January 27, 1940, issue of *The Lancet:* "It is irrational and probably harmful to use powerful and long-lasting vasoconstrictors since hyperemia is a necessary part of the natural resistance to infection. In addition, it is essential to use no drug which will hinder ciliary action, for on this depends the removal of secretion thrown out by the inflamed mucosa. Inhalants or local applications containing ephedrine or the like should therefore be avoided in the early stages; their sole use is in cases in which the initial acute phase is over and an infected accessory sinus is draining badly. The repeated application of astringents may give temporary relief, but it must be at the expense of the local processes of resistance." —*Illinois Health Messenger.* 1940 (Mar. 15) 12:49.

OBSTETRIC ANALGESIA IN COUNTRY PRACTICE

It is the duty of the members of our section to evolve unquestionably safe methods and procedures which will be available to, and practical for, the use of rural physicians. The great majority of babies born in this country are actually born in the country. Dr. McCormick spoke of the lesser danger of using cyclopropane and ethylene. It is impossible for me to take cyclopropane 20 miles into the country. These procedures are not practical in a rural community; neither are they safe when the obstetrician is usually alone or at best is assisted by a single nurse; when the occasion for anesthesia arises they are both too busy to bother with gas machines, rectal preparations and subsequent administration of ether and oil or paraldehyde or anything else. Since the obstetrician is not able to stay out in the country long enough to continue observation after intense narcosis, he should not even attempt their use. It is my experience that the use of barbiturates does narcotize babies. In about 200 recent deliveries I have not given a single dose of any sort of analgesia or any anesthetic. I recognize the use of anesthetics only for an obstetric emergency, and of these I recognize only operative intervention, which may be version and extraction, the necessity of performing and subsequently repairing an episiotomy or something of the sort. Forceps has not been used in my last 192 cases. It has never been taken from the bag. I decry the indiscriminate use of analgesia. If the obstetrician has the confidence of the mother, carefully explains what she must do to assist, talks to her, stands by her, her labor is easier, her pains are more tolerable, her baby is healthier, her labor is quicker and her subsequent course is more normal.—L. Mason Lyons, M.D., *Jour. Am. Med. Assn.,* 1939 (Dec. 2) 113:2045.

More emphasis should be placed upon the reciprocal dependence between the general practitioner and the specialist. Each needs the other; and when each has a fuller appreciation of the other's own particular problem . . . the result will be a more harmonious relationship and what is more important—the patient's interest will be better served.—Horace W. Leecing, D.O., *Clinical Osteopathy,* April, 1940.

Current Osteopathic Literature

Abstracted by R. E. Duffell, D.O.

CLINICAL OSTEOPATHY
LOS ANGELES
36: No. 1 (Jan.), 1940

Studies of a New Type of Yeast in Chronic Constipation. Chester H. Lyon, D.O., Los Angeles, Calif., and James Pirie Hart, B.Sc., Los Angeles, Calif.—p. 5.

Streamlined Technique. T. Burton Edmiston, D.O., Los Angeles, Calif.—p. 15.

Toxemias of Pregnancy. Joe Farber, D.O., Los Angeles, Calif.—p. 18.

*Roentgenotherapy in Lobar Pneumonia. A Comparison with Sulfapyridine Therapy. C. S. Merrill, D.O., Los Angeles, Calif.—p. 23.

The Early Recognition of Deafness in Children. Preston J. Stack, D.O., Los Angeles, Calif.—p. 27.

Manipulative Care in Arthritis. Wilbur R. Sanford, D.O., South Pasadena, Calif.—p. 34.

Manipulative Treatment of an Industrial Injury. H. C. Holloway, D.O., Los Angeles—p. 42.

What Medical Journals Say Regarding Sulfapyridine in Pneumonias. Miss May M. Brown, Librarian, C.O.P.S., Los Angeles, Calif.—p. 51.

***Roentgenotherapy in Lobar Pneumonia.**—The merits of roentgen therapy and sulfapyridine in acute lobar pneumonia are considered, the former being described as easily administered, producing definite relief within a few hours, and having less complications and lower mortality.

The approved roentgen technic is "approximately 135 kv., with 3 mm. aluminum filter (giving radiation of 0.3 angstroms effective) at 40 cm. distance. A total of 250 to 350 r units was administered at the initial treatment. If the temperature and blood count did not move toward normal within 36 hours, a second treatment of approximately 200 r units was given, using a different skin port . . . the area treated was that over the consolidation. . . . It was also found that the slightly higher kilovoltage (up to 200) used with adequate filtration usually produced the better results."

Favorable results of roentgen therapy in addition to routine treatment for a series of 105 cases of lobar pneumonia and approximately 30 cases of bronchopneumonia of Eugene V. Powell, M.D., reported in *The Journal A.M.A.*, were described by Powell as follows: "There was no definitely proved explanation as to why patients with pneumonia respond as favorably as they do to roentgen treatment, but the improvement seems to be associated with the destruction of the infiltrating leukocytes. This process may release the antibodies required to combat the infection. The possible increased permeability of the bacteria themselves may also be a reason for the favorable reactions. But, whatever may be the actual cause, we know that many patients react as though they had been given some highly potent and specific therapeutic agent instead of roentgen radiation." Only five cases of acute lobar pneumonia in Powell's group of 105 died, and the mortality in thirty cases of bronchopneumonia was reduced from 30 to 13 per cent. There were forty-nine cases of types I, II and III; the rest were of a higher undifferentiated type. Eight were of a mixed infection. Two deaths occurred in cases of type I in which serum had been given before radiation.

The only seeming contraindication to roentgen treatment of pneumonia is leukopenia, sometimes encountered in postinfluenzal pneumonia.

To determine the relative effectiveness of sulfapyridine and roentgen therapy in treatment of acute lobar pneumonia, Merrill suggests keeping records of the following data: (1) Type of infective organism; (2) age and sex distribution; (3) date of onset of illness; (4) date and type of each treatment; (5) radiographic diagnosis; (6) complications (when present at time of treatment), and (7) temperature and blood count.

Book Notices

MINOR SURGERY. By Frederick Christopher, S.B., M.D., F.A.C.S. Fourth Edition. Cloth. Pp. 990, with 639 illustrations. Price, $10.00. W. B. Saunders Company, West Washington Square, Philadelphia, 1940.

This excellent text, the latest previous edition of which was reviewed in this JOURNAL in February, 1937, maintains its high quality in the fourth edition. There is recognized readily the difficulty in providing an accurate definition of the term, "minor surgery"; of the fact that many conditions usually thought of as major may be much less important than some considered minor; that too often minor surgery becomes major, sometimes through carelessness or incompetence, but that a textbook on minor surgery is a necessity, partly because of developments of recent years in the field of medicine resulting in such a crowded medical curriculum that little time is left for the less serious ailments and injuries which form a large part of the young doctor's practice.

This edition shows the effect of painstaking revision, many sections having been entirely rewritten, old material discarded, and much new material added.

Particular effort has been made to point out the potential significance of apparently trivial conditions. There is emphasized the superiority of treatment of fresh wounds with soap and water, followed by débridement, no antiseptic being employed. Factors encouraging, as well as those discouraging, wound healing are considered. The principles of the care of infected wounds are brought out, and the latest methods clearly described. Much more consideration than in previous editions is given to strains and sprains of the back. Several other pages are given to illustrating and describing methods of manipulation used by F. A. Jostes, reported in *The Journal of Bone and Joint Surgery* for October, 1938, discussed in THE JOURNAL OF THE AMERICAN OSTEOPATHIC ASSOCIATION for November, 1938, page 178.

(Book Notices continued on ad page 16)

State Boards

Florida

The next examinations in the basic sciences will be held on November 1 at the University of Florida, Gainesville. All requests for application blanks should be sent to Dr. John F. Coon, Secretary, John B. Stetson University, DeLand. All applications must be made at least 15 days prior to the date of examination.

Illinois

The next examinations will be held on October 1, 2 and 3 at Chicago. For further details address O. C. Foreman, osteopathic examiner, 58 E. Washington St., Chicago.

Iowa

The Iowa Board of Examiners in the Basic Sciences will conduct a written examination at the State Capitol Building, Des Moines, on July 9 at 9:00 a.m. Address Ben H. Peterson, Ph.D., Secretary, Coe College, Cedar Rapids.

Kansas

R. R. Wallace, Wichita, recently was appointed to the state board.

Maine

Everett S. Winslow, Portland, was appointed recently to the state board, his term ending in November, 1944.

Harry J. Pettapiece, Camden, was elected chairman of the board and Albert E. Chittenden, Auburn, reelected secretary-treasurer.

Michigan

F. Hoyt Taylor, Lansing, recently was reappointed to the state board.

Minnesota

The next basic science examination will be held on October 1 at the University of Minnesota.

The Minnesota State Board of Examiners in Osteopathy has ruled that after a graduate of an osteopathic college has completed the basic science examination and has received the certificate, application may be made to the osteopathic board for a special examination immediately following any of the basic science examinations. For further information address Ernest S. Powell, secretary-treasurer, 925 New York Building, St. Paul.

South Carolina

Nancy A. Hoselton, Columbia, recently was reappointed to the Board for a four-year term, ending May, 1944.

West Virginia

The next examinations are to be held February 17 and 18, 1941, at Huntington. For further information write to the secretary, Guy E. Morris, 542 Empire Bank Bldg., Clarksburg.

Conventions and Meetings

Announcements

American Osteopathic Association, Forty-Fifth Annual Convention, Atlantic City, N. J., June 23-27, 1941. Program chairman, Walter W. Hopps, Jr., Los Angeles.

American College of Osteopathic Surgeons, Bashline-Rossman Hospital, Grove City, Pa., October 7-9. Program chairmen, O. O. Bashline and Walter F. Rossman, both of Grove City, Pa.

California state convention, March 22-26, 1941. Program chairman, J. Willoughby Howe, Hollywood.

Illinois state convention, Peoria, 1941.

Indiana state convention, French Lick, September 22-24. Program chairman, F. E. Warner, Bloomington.

Iowa state convention, Des Moines, May, 1941. Program chairman, Saul Klein, Des Moines.

Kansas state convention, Abilene, October 14-16. Program chairman, James B. Donley, Kingman.

Louisiana state convention, Alexandria, October.

Maine state convention, Portland, November 1, 2. Program chairman, Harry H. Campbell, Portland.

Massachusetts state convention, January 18, 1941.

Michigan state convention, October 29-31. Program chairman, H. C. Belf, Detroit.

Middle Atlantic States Osteopathic Association, Hotel Washington, Washington, D. C., October 4, 5. Program chairman, Frank R. Heine, Greensboro, N. C.

Minnesota state convention, St. Paul, May 2, 3, 1941. Program chairman, Ernest S. Powell, St. Paul.

Missouri state convention, Kansas City, October. Program chairman, J. Lincoln Hirst, St. Louis.

New England Osteopathic Association, Hotel Emerson, York Harbor, Me., September 20, 21. Program chairman, Mark Tordoff, Providence.

New York state convention, Utica, October 4-6. Program chairman, J. R. Miller, Rome.

Oklahoma state convention, Aldrige Hotel, Wewoka, October 17-19. Program chairman, H. C. Baldwin, Tulsa.

Pennsylvania state convention, Bellevue-Stratford Hotel, Philadelphia, October 11, 12. Program chairman, Michael Blackstone, Allentown.

South Dakota state convention, Vermillion, May, 1941. Program chairman, E. W. Hewett, Sioux Falls.

Tennessee state convention, Chattanooga, October.

Texas state mid-year meeting, October. Program chairman, J. Lester Vick, Amarillo. Annual convention, Dallas, 1941. Program chairman, Marille Sparks, Dallas.

Vermont state convention, Rutland, October 2, 3. Program chairman, Marian J. Norton, Windsor.

West Virginia state convention, Charleston, May 18-20, 1941. Program chairman, Robert B. Thomas, Huntington.

OFFICIAL AND AFFILIATED ORGANIZATIONS

ARIZONA

State Society

The officers were reported in THE JOURNAL for June and July. The following committee chairmen have been appointed: Membership and convention program, C. E. Towne, Tucson; professional education, C. C. Bradbury, Phoenix; hospitals, H. C. Bucholz, Yuma; censorship, W. F. Kuhnley, Tucson; student recruiting, Cora M. Tolle, Prescott; P. F. Hartman, Mesa; industrial and institutional service, A. B. Stoner, Phoenix; clinics, J. C. Chapman, Springerville; convention arrangements, L. A. Perino, Miami; legislation, D. L. Conner, Phoenix.

ARKANSAS

State Association

The program of the annual meeting and the newly elected officers were reported in THE JOURNAL for July. The following additional committee chairmen have been appointed: Membership, Edna W. Nies, Blytheville; censorship, Allene Mort, Siloam Springs; public health and education, Eugene M. Sparling, Hot Springs National Park; clinics, Paul W. Lecky, El Dorado; publicity, Chester C. Chapin, Little Rock; convention program, C. W. Dalrymple, Little Rock; convention arrangements, A. H. Sellars, Pine Bluff; legislation, H. V. Glenn, Stuttgart.

CALIFORNIA

Sonoma County Osteopathic Society

At Petaluma, June 19, Roland F. Robie, Oakland, spoke on "The Diagnosis of Heart Problems."

COLORADO

State Association

At Denver, June 9, the following officers were reelected: President, Milton F. Bartlett, Englewood; vice president, H. I. Magoun, Denver; secretary-treasurer, C. Robert Starks, Denver.

CONNECTICUT

State Society

The following officers were elected on June 15: President, Foster D. Clark, Torrington; vice president, O. L. Beach, West Hartford; secretary, Harold W. Stippich, Meriden, reelected; treasurer, Alma M. Breeden-Walsh, Stamford; sergeant-at-arms, Frank Poglitsch, New Britain.

DELAWARE

State Society

The officers were reported in THE JOURNAL for July. The following committee chairmen have been appointed: Censorship and publicity, R. M. Gregory; clinics, Leonard Lipscomb, all of Wilmington.

FLORIDA

Dade County Society of Osteopathic Physicians and Surgeons

The following officers were elected on July 2: President, R. B. Ferguson; vice president, C. A. McKinley, reelected; secretary, L. E. Gingerich, reelected; treasurer, J. S. Orr, all of Miami.

Hillsborough and Pinellas Counties Osteopathic Society

This group was organized at Tampa, June 27. The following officers were elected: President, Hunter R. Smith, St. Petersburg; vice president, Mina G. Raffenberg, Tampa; secretary-treasurer, George D. Noelling, St. Petersburg. R. O. Singleton, Tampa, was chosen chairman of public affairs and Norval E. Brown, Tampa, chairman of professional affairs.

Northeast Florida Osteopathic Medical Society

This group was organized on June 12 and the following officers were elected: President, Louis J. Larmoyeux, Jacksonville; vice president, Julian R. Sams, Neptune Beach; secretary-treasurer, Charles C. Hillyer, Jacksonville. Harry B. Merner, Jacksonville was appointed district legislative chairman, William E. White, Fernandina, chairman of the department of professional affairs, and Dr. Hillyer, chairman of the department of public affairs.

HAWAII

Osteopathic Society

The following officers were elected on June 25: President, Morris C. Auger; vice president, Bernice L. Gier, reelected; secretary-treasurer, Emily C. Dole, all of Honolulu.

ILLINOIS

Chicago—Southside Osteopathic Physicians' Society

The following officers were elected on June 20: President, H. G. Waschke; secretary-treasurer, H. S. Peterson, both of Chicago.

Winnebago County Osteopathic Society

The following officers were elected on June 13: President, H. P. Wise, Jr.; vice president, Allen Miller; secretary-treasurer, Stanley J. Adamson, all of Rockford.

The following committee chairmen have been appointed: Membership, C. E. Medaris; professional education and legislation, W. O. Medaris; hospitals, A. S. Loving; censorship, Maude S. Stowell; student recruiting and clinics, H. T. Wise; public health and education, Dr. Miller; publicity, N. W. Shellenberger; statistics, Dr. Adamson.

Second District Illinois Osteopathic Association

On June 12, Chester H. Morris, Chicago, spoke on "Low-Back Injuries" and George W. MacGregor, Chicago, talked on "Vitamin Starvation."

The August meeting is scheduled to be held at Orangeville.

INDIANA

Northern Indiana Osteopathic Association

On June 11 a discussion was conducted on the subject, "Diagnosis and Treatment of Inflammatory Conditions of the Skin That Occur in the Early Summer Months."

On June 18, "Osteopathy in the Treatment of Nervous and Mental Diseases" was discussed; June 25, "Edema;" July 2, "Shoulder Injuries;" July 9, "Intestinal Diseases;" July 16, "The Emotions and Their Effect on Health."

IOWA

State Society

The officers were reported in THE JOURNAL for June and the committee chairmen were reported in July. Additional chairmen are: D. E. Hannan, Perry, department of public affairs; O. Edwin Owen, Des Moines, radio; N. A. Cunningham, Marshalltown, department of public and professional welfare; Lydia T. Jordan, Davenport, child health conference; H. J. Marshall, Des Moines, ophthalmology.

KANSAS

Arkansas Valley Society of Osteopathic Physicians and Surgeons

The regular monthly meeting was held on June 18. Legislation was discussed by Ivan F. Hooper, Russell; B. L. Gleason, Larned; F. E. Loose, Lewis; L. B. Foster, Jetmore.

Central Kansas Association of Osteopathic Physicians and Surgeons

The officers were reported in THE JOURNAL for May. The following committee chairmen have been appointed: Censorship, L. A. Moore, Herington; student recruiting, Frank W. Shaffer, Salina; public health and education, E. F. Stark, Abilene; clinics, E. G. Nigh, McPherson; publicity, Lawton H. Hanna, Clay Center; program, L. V. Devine, Salina; professional development, William S. Childs, Salina.

North Central Kansas Society of Osteopathic Physicians and Surgeons

At Republic June 2, case reports were discussed.

North East Kansas Society of Osteopathic Physicians and Surgeons

The following are the present officers and committee chairmen: President, Forrest Kendall, Holton; vice president, Edison Comstock, Hiawatha; secretary-treasurer, S. Ann Wiegers, Marysville; hospitals, W. H. Riche, Blue Rapids, and Dr. Kendall.

Southern Kansas Osteopathic Association

The April meeting was held on the 16th at Kiowa and the May meeting on the 14th at Oxford.

On June 11, Raymond Wallace, Wichita, spoke on "New Methods in the Treatment of Various Diseases."

The July meeting was scheduled to be held on the 9th at Kingman.

Southwestern Kansas Society of Osteopathic Physicians and Surgeons

At Garden City, May 14, E. F. Pellette, Liberal, spoke on "Needle Surgery."

Tri-County Society of Osteopathic Physicians and Surgeons

At McPherson, May 15, R. W. Burditt, Moundridge, spoke on "Nephritis."

LOUISIANA

Southwest Louisiana Osteopathic Society

At Lake Charles, July 13, the following program was presented: "Psoasitis," M. R. Higgins, Lafayette; "The Sacroiliac Joint," Coyt Moore, Baton Rouge; "The Lumbar Vertebrae," J. R. Kidwell, Baton Rouge; "Osteopathic Mechanics of the Pelvis," A.O.A. film.

MAINE

State Association

The officers were reported in THE JOURNAL for July. The following committee chairmen have been appointed: Membership, Lester P. Gross, Jefferson; hospitals, Everett S. Winslow, Portland; ethics, H. J. Pettapiece, Camden; student recruiting, Roswell P. Bates, Orono; public health and education, William H. Lum, Gardiner; industrial and institutional service, R. C. Pfeiffer, Kennebunk Port; clinics, F. J. Chase, Ogunquit; publicity, L. W. Morey, Millinocket; statistics, Burleigh L. Larlee, Old Town; convention program and arrangements, Harry H. Campbell, Portland; Legislation, Albert E. Chittenden, Auburn; labor relations, Lowell M. Hardy, Portland.

York County Osteopathic Society

The following officers were elected in June: President, Carl Pfeiffer, Kennebunk Port; vice president, Marion May, Saco; secretary-treasurer, John Roberts, Sanford, reelected.

MASSACHUSETTS

Southeastern Massachusetts Osteopathic Society

On June 19, at South Harwich, Mary W. Walker, New Bedford, talked on "Normal Delivery."

MICHIGAN

Ingham County Osteopathic Association of Physicians and Surgeons

The regular monthly meeting was held at Vermontville on June 11.

South-Central Osteopathic Association

At Battle Creek, June 11, Esmond Appleyard, Chicago, discussed "The Clinical Aspects of Anemia."

MINNESOTA

Minneapolis Osteopathic Society

The annual picnic was held at Lake Minnetonka, July 13.

MISSOURI

Central Missouri Osteopathic Association

At Madison, July 18, W. V. Durden, Higbee, presented a paper on "Home Obstetrics," and R. W. Van Wyngarden, Mexico, commented on the paper. F. W. Zuspan, Flat River, president of the Missouri Association of Osteopathic Physicians & Surgeons, presented gavels to the past presidents of the group.

Jackson County Osteopathic Association

On June 18, a representative of the Southwestern Bell Telephone Company spoke on "Backstage in Telephone Research."

The following officers were elected: President, C. A. Povlovich; vice president, James Larimore; secretary-treasurer, Lillian V. McKenzie, reelected; sergeant-at-arms, John L. Heisler; chairman, ninth annual child health conference and clinic, Charles G. Stephens, all of Kansas City.

Northeast Missouri Osteopathic Association

At Macon, June 5, H. G. Swanson, Wichita, spoke on the history of osteopathy.

St. Louis Osteopathic Association

On June 18, the following officers were elected: President, Alston W. Noyes, Clayton; secretary-treasurer, E. B. Whitmer, reelected, both of St. Louis.

Southwest Missouri Osteopathic Association

The July meeting was scheduled to be held on the 17th at Joplin.

West Central Missouri Osteopathic Association

A rectal clinic was held at Clinton on June 4.

NEW HAMPSHIRE

State Society

The officers were reported in THE JOURNAL for July. The following committee chairmen have been appointed: Professional education, Marion Caldwell, Dover; censorship and legislation, Osmond R. Strong, Concord; public health and education and publicity, Ralph G. Beverly, Keene; convention program, C. Stevens Garran, Roches-

ter, and Robert E. Maxwell, Nashua; convention arrangements, Dr. Garran.

Long Island Osteopathic Society

The officers were reported in THE JOURNAL for July. The following committee chairmen have been appointed: Membership, Paul Zea, Riverhead; professional education, Charles K. Smith, Freeport; clinics, Gerard Campbell, Lynbrook; legislation, Elizabeth Carlen, Garden City.

OHIO

State Association

The officers were reported in THE JOURNAL for July. The following committee chairmen have been appointed: Membership, C. B. Gephart, Dayton; veterans, W. H. Schulz, Cleveland; public health and education, C. L. Ballinger, Marietta; lyceum, R. G. Reesman, Lancaster; P. & P.W., Charles A. Purdum, Cleveland; convention program, J. W. Mulford, Cincinnati; student recruiting, L. F. Licklider, Zanesville; alumni, W. W. Custis, Dayton; fraternity, H. J. Long, Toledo; clinics, R. H. Singleton, Cleveland; convention general chairman, Arthur P. Bumstead, Columbus; inter-district meetings, H. R. Sprague, Lakewood; constitution, D. V. Hampton, Cleveland; graduate placement, H. L. Samblanet, Canton; golf, A. V. Benedict, Columbus; professional cooperation and assistance, N. J. Musson, Fremont.

Fifth (Dayton) District Osteopathic Society

The following officers were elected in April: President, R. F. Dobeleit, Dayton; vice president, A. B. Carson, Piqua; secretary-treasurer, C. E. Miller, Dayton.

The following committee chairmen have been appointed: Membership, W. G. Bradford; professional education, P. A. Hoggan; hospitals, H. M. Dill; censorship, H. C. Harris; student recruiting, E. H. Cosner; public health and education, M. D. Carter; industrial and institutional service, J. M. Zimmerman; clinics, Frank Wilson; publicity, D. A. Stiles; statistics, Paul F. Brenner; convention program, C. Hutchison; convention arrangements, J. S. Elef; legislation, L. A. Lydic; professional development, F. W. Mumma; displays at fairs and expositions, M. E. McCauley, all of Dayton.

A picnic was held on June 19.

OKLAHOMA

Central Oklahoma Osteopathic Association

At the June meeting, Lloyd Tannehill, Henryetta, was elected president.

Kay County Osteopathic Association

The annual picnic was held on June 13.

OREGON

State Association

M. E. Gadwa, Salem, has resigned as secretary-treasurer.

The officers were reported in THE JOURNAL for July. The following committee chairmen have been appointed: Legislation, W. C. Zeller, Salem; public relations, C. H. Beaumont, Portland; social, Virginia Leweaux, Portland; graduate location, E. Tracy Parker, Portland; vocational guidance, G. S. Jennings, Medford; clinics, W. P. Goulding, Corvallis; hospital relations, R. R. Sherwood, Medford.

PENNSYLVANIA

Central District Osteopathic Society

(See Lehigh Valley Osteopathic Society.)

Harrisburg Osteopathic Society

The following are the present officers and committee chairmen: President, George Stineman; vice president, Stuart Harkness; secretary, Martha Shields; treasurer, Phineas E. Dietz, reelected; clinics, J. C. Bachman; publicity, Dr. Dietz; legislation, Dr. Stineman, all of Harrisburg.

Lehigh Valley Osteopathic Society

A joint meeting with the Central District Osteopathic Society was held on June 15. It was the annual outing.

Philadelphia Osteopathic Physicians' Club

The following officers were elected on May 12: President, George A. Gercke; vice president, William P. Masterson; secretary, Lindsay Thomson; treasurer, William J. Furey, all of Philadelphia. Tommaso Creatore, Philadelphia, is membership chairman.

Western Pennsylvania Osteopathic Association

The quarterly meeting was held on the 19th. In the morning surgical clinics were held at the Bashline-Rossman Hospital. In the afternoon, Prof. E. K. Patton, of the faculty of Geneve College, was the principal speaker. F. A. Belland, Sharon, discussed "Athletic Injuries."

SOUTH CAROLINA

State Association

The following officers were reelected on May 17: President, T. C. Lucas, Columbia; vice president, Emma Hale, Spartanburg; secretary-treasurer, Joanna M. Barnes, Ridge Spring.

The following committee chairmen have been appointed: Membership, public health and education, and convention program, Nancy A. Hoselton, Columbia; student recruiting, Dr. Barnes; publicity, Walter Hale, Spartanburg; legislation, Edward Pratt, Charleston.

TEXAS

Corpus Christi Osteopathic Society

At Corpus Christi, July 9, James M. Tyree, Corpus Christi, spoke on "The Diagnosis of Ureteral Stricture," illustrating his talk with x-ray films.

UTAH

State Association

On June 12, Charles Bryant Wilson, Salt Lake City, spoke on "New Ideas Concerning the Anemias."

VIRGINIA

State Association

The officers were reported in THE JOURNAL for June. The following committee chairmen have been appointed: Membership, A. H. Bernhard, Richmond; professional education, H. S. Liebert, Richmond; hospitals, B. D. Turman, Richmond; censorship, L. C. McCoy, Norfolk; student recruiting, Felix D. Swope, Alexandria; public health and education, Charles P. Dickerman, Staunton; industrial and institutional service, H. H. Bell, Petersburg; clinics, Dr. Turman; publicity, Dr. Liebert; statistics, Gena L. Crews, Lynchburg; convention program and arrangements, Carl C. Akers, Lynchburg; legislation, E. H. Shackelford, Richmond; professional development, Margaret E. Bowen, Richmond; displays at fairs and expositions, O. L. Miller, Harrisonburg.

WASHINGTON

State Association

The following officers were elected on May 30: President, J. Henry Hook, Tacoma; president-elect, W. G. Flexer, Cashmere; vice president, Rosetta Shortridge, Seattle; secretary, S. M. Pugh, Everett, reelected; treasurer, H. P. Morse, Wenatchee, reelected. The following chairmen have been appointed: Department of public affairs, A. B. Cunningham, Seattle; censorship, A. B. Ford, Seattle; legislation, C. H. Baker, Seattle; industrial and institutional service, Einer Petersen, Tacoma; public health, G. H. Parker, Seattle; federal and state bureaus, C. B. Utterback, Tacoma; department of professional affairs, Dr. Flexer; professional development, H. V. Hoover, Tacoma; hospitals and clinics, John Thorp, Seattle; vocational guidance, H. L. Chadwick, Spokane.

King County Osteopathic Association

At the June 13 meeting, the following officers were elected: President, G. H. Parker; vice president, Hattie G. Slaughter, reelected; secretary, G. S. Fuller, reelected; treasurer, A. B. Cunningham, reelected.

The next meeting will be held on October 10.

WISCONSIN

Fox River Valley District Society of Osteopathic Physicians and Surgeons

On June 13, R. B. Hammond, Appleton, spoke on "The Lymphatic System."

CANADA

Ontario Academy of Osteopathy

The officers were reported in THE JOURNAL for July. The following committee chairmen have been appointed: Membership and censorship, C. V. Hinsperger, Windsor; professional education, Ray Linnen, Ottawa and Douglas Firth, Toronto; hospitals and industrial and institutional service, Harry Sutton, Hamilton; student recruiting, Mary L. Heist, Kitchener; public health and education, George A. DeJardine, Toronto; statistics, E. S. Detwiler, London, and Olive Matthews, Kitchener; legislation, M. E. Moyer, Hamilton; displays at fairs and expositions, Douglas Firth, Toronto and Don Jaquith, Toronto.

SPECIAL AND SPECIALTY GROUPS

Middle Atlantic States Osteopathic Association

At Washington, D. C., October 4 and 5, a two-day program will be devoted exclusively to technic, arranged and directed by the executive officers of the Osteopathic Manipulative Therapeutic and Clinical Research Association. Technic will be demonstrated by Perrin T. Wilson, Cambridge, Mass., T. L. Northup, Morristown, N. J., and James A. Stinson, St. Petersburg, Fla.

New England Osteopathic Association

The officers were reported in THE JOURNAL for June. The following committee chairmen have been appointed: Membership, Ernest A. Marcoux, Newton, Mass.; publicity, Osmond R. Strong, Concord, N. H.; convention program, Mark Tordoff, Providence; convention arrangements, fall meeting, Myron Ladd, Portland, Me., spring meeting, William T. Knowles, Boston; legislation, Albert E. Chittenden, Auburn, Me.; displays at fairs and expositions, Walter Davies, Somerville, Mass.

Osteopathic Manipulative Therapeutic and Clinical Research Association

This Association was granted affiliation with the American Osteopathic Association by the Board of Trustees at Cincinnati in July, 1938. The purposes of the organization are:

1. Banding together those who are interested primarily in manipulative therapy.
2. Exchanging experiences and ideas relative to manipulative therapy.
3. Collecting and studying clinical reports of cases treated principally by manipulative therapy.
4. Disseminating among its members the results of its discussions and research investigations as it applies to manipulative therapy.
5. Recording for publication and further study the experiences of men who have been long in practice and have relied for their results principally upon manipulative therapy.

The members of the Association elect a Board of Governors composed of fifteen whose terms of office run for three years, staggered so that five retire each year. The officers of the Association are elected by the Governors, who also govern the policies of the Association.

Any member of the American Osteopathic Association is welcome

to membership in the Osteopathic Manipulative Therapeutic and Clinical Research Association upon the payment of $2.00 to the Secretary-Treasurer. The money collected as dues is used exclusively for the incidental expenses of the latter Association and the Manipulative Therapeutics Section of the A.O.A., and the expense of mimeographing papers given at the Section meetings to be distributed without charge to Association members.

In the future only members of the Association will receive the mimeographed convention papers. There are, however, a limited number of copies of Vol. 2, a collection of ten papers covering the following subjects, available at $1.00 a copy.

An Osteopathic Analysis for Manipulative Therapeutics	Perrin T. Wilson, D.O.
Manipulative Therapy	M. E. Clark, D.O.
A Plea for Scientific Development of Osteopathy	C. L. Farquharson, D.O.
Manipulative Lymphatic Therapy	George W. Goode, D.O., and F. P. Millard, D.O.
Osteopathic Treatment of Goiter	Thomas L. Ray, D.O.
Intestinal Obstruction	Harry W. Gamble, D.O.
Osteopathic Treatment of Carcinoma	Hunter R. Smith, D.O., and James A. Stinson, D.O.
Inter-Relation of Spinal Segments	T. L. Northup, D.O.
Tic Douloureaux	Perrin T. Wilson, D.O.
Low-Back Conditions	O. R. Meredith, D.O.

The third annual meeting of the Osteopathic Manipulative Therapeutic and Clinical Research Association was held at St. Louis. Each morning during the convention, from 7:45 to 8:45, there were five separate classes of instruction conducted. The instructors were rotated so that each group had the complete program. The subjects and instructors were as follows: Pneumonia, Dr. Harry W. Gamble; prostatitis, Dr. M. T. Mayes; acute lumbago, Dr. Earl J. Drinkall; leucorrhea, Dr. Riley D. Moore; tic douloureaux, Dr. Perrin T. Wilson.

The following were reelected to office at a meeting on Friday afternoon, June 28: Dr. Perrin T. Wilson, Chairman; Dr. E. C. Unverferth, Vice Chairman; and Dr. T. L. Northup, Secretary-Treasurer. The number of Governors was raised by vote of the Association from nine to fifteen and the following five men were elected to serve for three years: Drs. John A. MacDonald, George W. Goode, Riley D. Moore, James A. Stinson, and J. S. Denslow.

The Osteopathic Manipulative Therapeutics Section, which met each afternoon of the convention, was most successful in point of attendance and general interest. While it may be impossible to have all papers given at the St. Louis convention mimeographed during the current year, most of them will be mimeographed and distributed free to members who join the Association before September 1.

DIVISIONAL SOCIETY PRESIDENTS AND SECRETARIES

As of July 15, 1940

DIVISIONAL SOCIETY	PRESIDENT	SECRETARY
Alabama	Meredith White, 432 First Natl. Bank Bldg., Mobile	Percy H. Woodall, 617 Frank Nelson Bldg., Birmingham
Arizona	V. W. Kilcrease, Casa Granda	Kathryne W. Chapman, Box 239, Springerville
Arkansas	Carl H. Nies, 514 W. Main St., Blytheville	Chester C. Chapin, 1007 Donaghey Bldg., Little Rock
California	K. Grosvenor Bailey, 649 S. Olive St., Los Angeles	Charles E. Atkins, 880 E. Colorado St., Pasadena Executive Secretary, Mr. Thomas C. Schumacher, 1711 Griffin Road, Los Angeles
Colorado	Milton F. Bartlett, 3191 S. Broadway, Englewood	C. R. Starks, 1459 Ogden St., Denver
Connecticut	Foster D. Clark, 113 Main St., Torrington	Harold W. Stippich, 34½ E. Main St., Meriden
Delaware	George F. Nason, Delaware Ave. & Madison St., Wilmington	A. A. Golden, 600 N. Broome St., Wilmington
Dist. of Col.	Winthrop P. Wilcox, 1026 Sixteenth St., N.W., Washington	Clarence R. Cook, 1627 16th St., N.W., Washington
Florida	M. G. Hunter, 204-06 Cragor Bldg., Leesburg	Charles W. Vogler, Bedell Bldg., Delray Beach
Georgia	W. C. Holloway, 502 Upchurch Bldg., Thomasville	Kenneth H. Wiley, 904 Atlanta Natl. Bank Bldg., Atlanta
Hawaii	Morris C. Augur, 318 Hawaiian Trust Bldg.	Emily C. Dole, 1548 Kewalo St., Honolulu
Idaho	Clarence L. Heick, 311 14th Ave., S., Nampa	N. J. Jacobson, 324 Noble Bldg., Boise
Illinois	R. L. Dinges, Orangeville.	Fred B. Shain, 7106 Crandon Ave., Chicago
Indiana	E. B. Cary, 22½ E. National Ave., Brazil	F. L. Swope, 36 S. Eighth St., Richmond
Iowa	Holcomb Jordan, 1209 Brady St., Davenport	Mr. Dwight James, 600 Walnut Bldg., Des Moines
Kansas	W. H. Riche, Blue Rapids Hospital, Blue Rapids	Robert A. Steen, 307 Citizens Natl. Bank Bldg., Emporia
Kentucky	Robert L. Whipple, 312 Rugby Bldg., Owensboro.	Norman H. Wright, 1968 Douglas Blvd., Louisville
Louisiana	A. E. Stanton, Box 505, Crowley	Henry Tete, 1117 Maison-Blanche Bldg., New Orleans
Maine	Wallis L. Bursey, 48 Perham St., Farmington	Louise M. Jones, 11 Deering St., Portland
Maryland	H. D. Shellenberger, Mulberry & Cathedral Sts., Baltimore	Eunice B. Waugaman, 33 S. Center St., Cumberland
Massachusetts	Harry E. Cash, 170 Warren St., Newton Center	Ernest A. Marcoux, 337 Washington St., Newton
Michigan	Joseph W. Norton, 33200 Grand River Ave., Farmington	Philip E. Haviland, 7310 Grand River Ave., Detroit Executive Secretary, Mr. Warren G. Hooper, 1001 E. Porter St., Albion
Minnesota	Frank F. Graham, 306 Choate Bldg., Winona	A. J. Smith, 730 Metropolitan Bank Bldg., Minneapolis
Missouri	F. W. Zuspan, 205-06 Tucker Bldg., Flat River	H. D. McClure, 503 S. Davis, Kirksville
Montana	J. R. Mathis, Miles Block, Miles City	J. H. Strowd, Glendive
Nebraska	A. E. Moss, 112 Main St., Kimball	O. C. Hudson, 118 N. Sixth St., Plattsmouth
New Hampshire	C. Stevens Garran, 18 Wakefield St., Rochester	Robert E. Maxwell, 7 Concord St., Nashua
New Jersey	Francis A. Finnerty, 71 Park St., Montclair	Lois Goorley, 202 W. State St., Trenton
New Mexico	J. L. Cornelius, Grants Congregational Hospital, Grants	L. M. Pearsall, 824 First Natl. Bank Bldg., Albuquerque
New York	William O. Kingsbury, 60 E. 42nd St., New York	Melvin B. Hasbrouck, 90 State St., Albany
North Carolina	E. M. Stafford, 111 Corcoran St., Durham	Frank R. Heine, 910 Security Bank Bldg., Greensboro
North Dakota	E. O. Smith, Cavalier	Georgianna Pfeiffer, 110½ Broadway, Fargo
Ohio	R. S. Licklider, 40 S. Third St., Columbus	James O. Watson, 40 S. Third St., Columbus Executive Secretary, Mr. William S. Konold, 44 E. Broad St., Columbus
Oklahoma	R. V. Toler, Mammoth Bldg., Shawnee	J. Mancil Fish, 218 Pythian Bldg., Tulsa
Oregon	William E. Hinds, Commercial Bank Bldg., Hillsboro	
Pennsylvania	H. Dale Pearson, 252 W. Tenth St., Erie	Roy E. Hughes, 39 S. Sixth St., Indiana
Rhode Island	Frank Gants, 1047 Broad St., Providence	Chester Handy, 40 Rolfe St., Cranston
South Carolina	T. C. Lucas, 1521 Main St., Columbia	Joanna Barnes, Ridge Spring
South Dakota	C. C. Pascale, Box 216, Centerville	Benedicta M. Lewis, Pierre
Tennessee	O. Y. Yowell, Hamilton Natl. Bank Bldg., Chattanooga	Helen A. Terhuwen, 930 Third Natl. Bank Bldg., Nashville
Texas	Roy G. Russell, Mid-Continent Bldg., Fort Worth	J. W. McPherson, 418 Allen Bldg., Dallas
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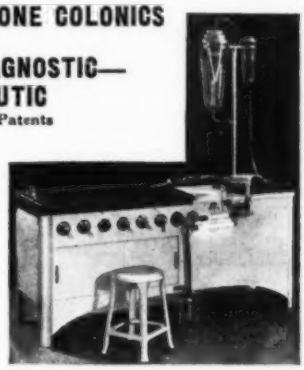

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(Continued from page 14)

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van de Sande, Theodore W., from 230 Main St., to 615 Main St., Toms River, N. J.

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Von Wald, Vernon, DMS '40; 2101 N. 52nd St., Milwaukee, Wis.

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Wallace, Richard H., KCOS '40; 11 Lincoln St., Stoneham, Mass.

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Wilson, Walter B., from 10918 W. Pico Blvd., to 1541 Westwood Blvd., Los Angeles, Calif.

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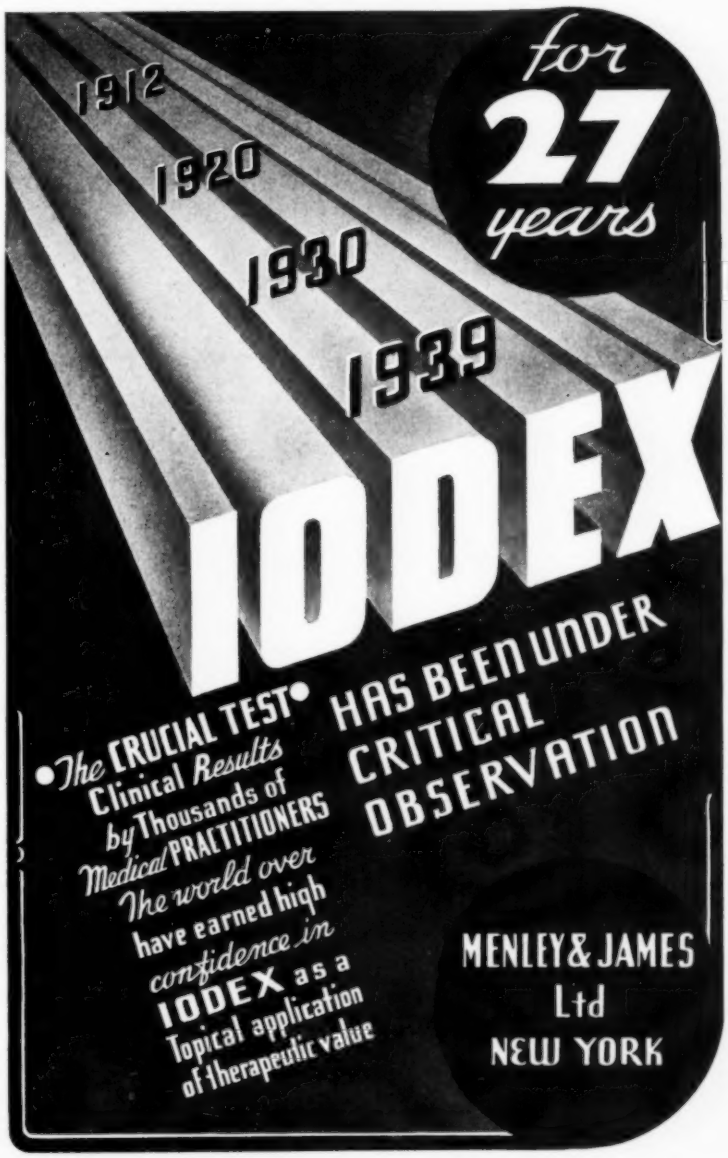
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(Continued from page 575)

COMPENDIUM OF REGIONAL DIAGNOSIS IN LESIONS OF THE BRAIN AND SPINAL CORD. A Concise Introduction to the Principles of Localization of Diseases and Injuries of the Nervous System, By Robert Bing, Professor of Neurology, University of Basel, Switzerland. Translated and Edited by Webb Haymaker, Assistant Clinical Professor of Neurology and Lecturer in Neuroanatomy, University of California. Eleventh Edition. Pp. 292. 125 illustrations, 27 in color and 7 plates. Price, $5.00. The C. V. Mosby Company, 3523-25 Pine Boulevard, St. Louis, 1940.

This is a small but outstanding book which through the thirty years since the appearance of its first edition, has been a guide to the localization of brain and spinal cord lesions, and a presentation of the synthesis of a great mass of material relating thereto in such a way that it would be of practical use to students and practitioners.

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(Continued from page 16)

INJECTION TREATMENT OF HERNIA, HYDROCELE, GANGLION, HEMORRHOIDS, PROSTATE GLAND, ANGIOMA, VARICOCELE, VARICOSE VEINS, BURSAE, AND JOINTS. By Penn Riddle, B.S., M.D., F.A.C.S. Cloth. Pp. 290, with 153 illustrations. Price, $5.50. W. B. Saunders Co., West Washington Square, Philadelphia, 1940.

This book undertakes "to include all those conditions to which the injection method of treatment may properly be applied." There are sections on the injection treatment of hernia, of varicose veins, of hemorrhoids and of hydrocele, varicocele, ganglion, bursae, joints, angioma and the prostate gland. The largest part of the book is given to hernia, varicose veins coming next and hemorrhoids third.

In the section on hernia, for example, we are given a chapter on the history of the injection treatment, one on the anatomy of the abdominal wall, one on the classification, etiology and structure of hernia, one on diagnosis, one on trusses, one on sclerosing, on complications and on results. Rather similar arrangements of chapters are followed in the sections devoted to the injection treatment of varicose veins and of hemorrhoids. Each of the chapters in Part IV includes somewhat the same type of consideration as do these longer sections, and each of the four sections has a considerable bibliography.

The book is a valuable contribution to the literature on the subject.

A TEXTBOOK OF HISTOLOGY. 8th Edition. By Harvey Ernest Jordan, A.M., Ph.D. Cloth. Pp. 690. Price, $7.00. D. Appleton-Century Company, 35 W. 32nd Street, New York City, 1940.

This latest edition of a standard text retains the general plan which has been followed through the years, but incorporates important recent additions to the subject and includes many new illustrations. The chapter on blood has been entirely rewritten, and others thoroughly revised So much has been published in recent years relating to histology that it has seemed no longer practical to include references in the text. All references are recorded as footnotes and reassembled in a bibliographical list at the end of the book.

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BOOK NOTICES

(Continued from page 17)

A TEXTBOOK OF PATHOLOGY. By W. G. MacCallum, Professor of Pathology and Bacteriology, The Johns Hopkins University, Baltimore. Seventh Edition. Cloth. Pp. 1302, with 697 illustrations. Price, $10.00. W. B. Saunders Company, West Washington Square, Philadelphia, 1940.

The latest previous edition of this book was favorably reviewed in THE JOURNAL of the American Osteopathic Association for February, 1937. The seventh edition maintains the high standard of the one there described. The doctor goes on the assumption that pathology and clinical medicine really are the same thing viewed from slightly different angles, and that his presentation of the subject of pathology, therefore, including some mention of symptoms, may make it seem like a textbook of clinical medicine. He goes on the basis of causes, so far as they can be determined, attempting to follow their effects in disturbing the natural functions of the body, the gross and microscopical changes they produce in the tissues and their organ combinations and the physical and chemical changes that interrupt life. He continues to emphasize the importance of the detailed study from every viewpoint of cases at autopsy.

BRUCELLOSIS IN MAN AND ANIMALS. By I. Forest Huddleson, D.V.M., M.S., Ph.D. Cloth, Pp. 339, with 40 illustrations. Price, $3.50. The Commonwealth Fund, 41 E. 57th Street, New York City, 1939.

Five years ago, Dr. Huddleson brought out "Brucella Infections in Animals and Man," which was a manual on methods of laboratory diagnosis. The present volume replaces that and goes much farther, including the clinical aspects of this group of diseases. The medical sections have been contributed by physicians with long experience in the field, one of them having conducted investigations of undulant fever in the United States; one having for years devoted time to the study of brucella melitensis in Malta and one having been concerned with the problems of animal and human health arising from the disease.

Brucellosis is receiving increasing attention as a disease of world-wide importance. Nobody knows how extensive is its distribution in this country, because of the differences in the accuracy of diagnosis. But one of the contributors to this volume estimates that it may be three times as prevalent as was tuberculosis at the time its eradication was begun.

PHYSIOLOGY IN HEALTH AND DISEASE. By Carl J. Wiggers, M.D., Third Edition. Cloth. Pp. 1144, with 218 illustrations. Price, $9.50. Lea and Febiger, Washington Square, Philadelphia, September, 1939.

This is the third edition of the excellent text whose second edition was so favorably reviewed by Dr. R. C. McCaughan in THE JOURNAL OF THE A.O.A. for January, 1938.

The book is designed to meet the needs of medical students, clinicians, practitioners and investigators, and the revisions which have been made are well calculated to keep the text in the forefront of the literature of this important and constantly advancing science. Although it is less than three years since the second edition appeared, yet it is estimated that more than a third of the text has been completely rewritten, with numerous and significant changes in the rest. More than 1,400 new references have been added; the illustrations have been increased in number with 52 new ones added. The index is comprehensive, and the use of cross references is general.

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Books Received

THE TISSUES OF THE BODY: An Introduction to the Study of Anatomy. By W. E. LeGros Clark, F.R.S. Cloth. Pp. 372, with 109 illustrations. Clarendon Press of the Oxford University Press, Amen House, E.C. 4, London, England, 1939.

PHYSICAL TREATMENT BY MOVEMENT, MANIPULATION AND MASSAGE. By James B. Mennell, M.A., M.D., B.C. (Cantab.), etc. 4th Edition. Cloth. Pp. 669, with 281 illustrations. Price, $7.00. The Blakiston Company, 1012 Walnut St., Philadelphia, 1940.

MODERN DERMATOLOGY AND SYPHILOLOGY. By S. William Becker, M.D., and Maximillian E. Obermayer, M.D. Cloth. Pp. 871, with 461 illustrations and 32 color plates. J. B. Lippincott Company, East Washington Square, Philadelphia, 1940.

THE MERCK INDEX. 5th Edition. Flexible Binding. Pp. 1060. Price, $3.00. Merck & Co., Inc., Rahway, N. J., 1940.

THE CYCLOPEDIA OF MEDICINE. Revision Service 1940. George Morris Piersol, B.S., M.D., Editor-in-Chief. Cloth. Pp. 1108, with illustrations. Index to Revision Service, 1937, 1938, 1939 and 1940. F. A. Davis Company, 1914 Cherry St., Philadelphia, 1940.

A HANDBOOK FOR DISSECTORS. By J. C. Boileau Grant and H. A. Cates. Cloth. Pp. 239. Price, $2.50. The Williams and Wilkins Company, Mt. Royal and Guilford Avenues, Baltimore, 1940.

A METHOD OF ANATOMY: DESCRIPTIVE AND DEDUCTIVE. 2nd Edition. By J. C. Boileau Grant, M.C., M.D., Ch.B., F.R.C.S. (Edin.). Cloth. Pp. 794, with 651 illustrations. Price, $6.00. The Williams and Wilkins Company, Mt. Royal and Guilford Avenues, Baltimore, 1940.

SCIENCE AND EVERYDAY LIFE. By J. B. D. Haldane, F.R.S. Cloth. Pp. 284. Price, $2.00. The Macmillan Company, 60 Fifth Avenue, New York City, 1940.

WAYS TO COMMUNITY HEALTH EDUCATION. By Ira V. Hiscock. Cloth. Pp. 306, with illustractice. Price, $3.00. The Commonwealth Fund, 41 E. Fifty-Seventh Street, New York City, 1939.

THE ERA KEY: USP XI—NF VI. 5th Edition. Revised by Lyman D. Fonda. Cloth. Pp. 320. Price, $1.00. The Haynes & George Co., Inc., 850 Broad Street, Newark, N. J., 1939.

GREEN'S MANUAL OF PATHOLOGY. 16th Edition. Revised and Enlarged by H. W. C. Vines, M.A., M.D. Cloth. Pp. 1166, with 701 illustrations. Price, $8.50. Williams and Wilkins Company, Mt. Royal and Guilford Avenues, Baltimore, 1940.

PRINCIPLES OF SURGICAL CARE: SHOCK AND OTHER PROBLEMS. By Alfred Blalock, M.D. Cloth. Pp. 325, with 13 illustrations. Price, $4.50. C. V. Mosby Company, 3523-25 Pine Blvd., St. Louis, 1940.

HEALTH IS WEALTH. By Paul De Kruif. Cloth. Pp. 246. Price, $2.00. Harcourt, Brace and Company, 383 Madison Avenue, New York City, 1940.

THE WAYSIDE: HOME OF AUTHORS. By Margaret M. Lothrop. Cloth. Pp. 202. Price, $1.00. American Book Company, 100 Washington Square, New York City, 1940.

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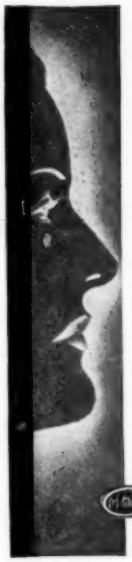

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